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A New Year of Opportunity

THE theme of the Christmas and New Year message of Sir Eustace Missenden, Chairman of the Railway Executive, to the 600,000 employees of British Railways, given in the current issue of the *British Railways Magazine*, is "care, courtesy, and cleanliness" during the coming year. Although, he says, circumstances are against the railways, railwaymen have every reason to be proud of what they have already achieved, and 1951 will be a year of further progress—and of opportunity: to those many railwaymen who are directly or indirectly in contact with the travelling public, the year will provide ample opportunity for achieving maximum efficiency in the passenger services used by the thousands from this country and overseas visiting the Festival of Britain, and for regaining, adds Sir Eustace Missenden, some of the passenger revenue which has been lost. There is no need to enumerate the handicaps under which railwaymen work. They include the restrictions on capital development, and therefore on many new works, which can only be discouraging to men of creative energy and—despite the ingenuity and effort exercised in making the best of limited resources—to those who must work with obsolete plant. There is also the misinformed and often malicious criticism which is directed, now as in the past, at railways. The message emphasises the intention of the Railway Executive to provide further scope for the wealth of talent and initiative amongst railwaymen; reference also is made to the facilities (which exist now) for consultation and the making of suggestions. Each railwayman, even if one of a somewhat smaller brotherhood than in the past, will know that his particular effort is contributing to the total success.

Lord Hurcomb on Freedom of Speech

IN our October 20 & 27 issue Sir Eustace Missenden defined the position of officers and staff in the reading of papers or participation in discussions before professional bodies. He pointed out that not only did British Railways recognise the right of any member of the staff to do so, but that it was the desire of the Railway Executive to promote healthy discussion. Approval of any papers was required by the Railway Executive only if the contributions incorporated statistics, data or designs not previously made public, or liable to be construed as an expression of the policy of the Executive on a matter of current public interest. Lord Hurcomb, Chairman of the British Transport Commission, also dealt with this matter when speaking to members of the Institution of Railway Signal Engineers last week. He said that the Commission and Executives welcomed and encouraged their staffs to speak or write on subjects on which they had special experience and knowledge. Reliance was placed on their discretion and good sense to be suitably guarded in any views they expressed, even if they were said to be personal views, lest their opinions be accepted by the public as representing official policy.

Need for Discretion

LORD HURCOMB emphasised the difference between contributing towards knowledge of the art and science of transport in its many aspects and the publicly making statements on matters of policy not yet public knowledge, or criticising decisions which it might be the duty of the speaker to carry out. No-one who behaved as a responsible and loyal officer need be apprehensive that his seniors would be censorious of what he might say in discussion. No responsible person can in fact express publicly merely personal views on current and disputed issues of importance in which he is directly concerned and on which he will be assumed to have knowledge not available to everyone. Lord Hurcomb's statement should be widely welcomed as making clear the position which obtains insofar as employees of the nationalised transport undertakings are concerned. In our view there is another point which has to be borne in mind. The B.T.C. and its Executives constitute a virtual monopoly of employment for the majority of transport people in this country. The presence of very senior officers at debates is likely to have a restraining influence on the junior members of the staff. It is no less than human nature for the younger man to avoid drawing attention to himself if he fears that his remarks may not be received favourably. That is a psychological problem.

New Staff Training Scheme

A BRITISH RAILWAYS scheme for training in commercial, operating, and motive power work, over a three-year period, to assist men under 28 to qualify for consideration for promotion to higher administrative and executive posts, has been introduced by the Railway Executive. Men undergoing training will be called Traffic Apprentices. Appointments will be made by a selection board from salaried or wages staff who pass a preliminary written examination, conducted by a recognised educational examining body. Selection will also be made from candidates who are either graduates of a British university, or are suitably qualified ex-regular officers of H.M. Forces. Appointment will not depend entirely on the examination, nor on academic attainments in the case of university

graduates. After training, a traffic apprentice who makes good will be appointed to a position for which he is considered suitable; after this initial appointment he will take his place with other staff in consideration for promotion but will not have have any special right to promotion. Approximately 2,500 railwaymen sat for the first examination and the final selection will be made from about 120 of this number. These men were from almost all sections of the service.

British Transport's Research Organisation

WITH the re-organisation of the research facilities of the Railway Executive announced last week the broad structure of the organisation recommended last year has now been established. The organisation is designed to serve all branches of the British Transport undertaking. Three of the Executives will have their own laboratories, each devoted primarily to problems arising from its engineering and operating activities though jointly serving the remaining Executives. The largest of the Executive research organisations is that of the Railway Executive, under its Director of Research, Mr. T. M. Herbert, and within the London Transport Executive Mr. A. T. Wilford has been appointed Director of Research. The laboratories at Chiswick will be developed to carry out research also on behalf of the Road Haulage Executive and the Road Passenger Executive which will not have separate organisations of their own. Plans for building a new laboratory at Southall by the Docks & Inland Waterways Executive, whose Research Officer is Mr. J. T. Evans, are well advanced. Co-ordination of the work of the laboratories is effected by the Chief Research Officer of the B.T.C. Dr. H. E. Merritt, who is also Chairman of the Research Co-ordination Committee. The Research Advisory Council of the British Transport Commission meets quarterly under the chairmanship of Lord Hurcomb to review the work of all the research departments.

Overseas Railway Traffics

DURING October gross earnings of the Canadian Pacific Railway rose by £1,163,000 to £12,247,000 and though there was an accompanying advance in working expenses, net earnings were £693,000 higher at £2,193,000. On the aggregate gross earnings of the C.P.R. have increased by £2,895,000 to £103,218,000 and net earnings for the current 43 weeks are £9,063,000 as compared with £4,334,000 for the same period of 1949. On December 3 Antofagasta (Chili) & Bolivia traffics, which suffered a number of setbacks in the first part of the current financial year, were £76,310 above receipts for the equivalent 48 weeks of last year. Traffics for the fortnight ended December 3 improved by £59,380 to £219,900 and aggregate receipts now amount to £3,295,024. Gold Coast traffics during October were £44,691 higher at £261,844 and receipts for the current 31 weeks are £1,651,230, as compared with £1,615,675 last year. Though during October net revenue of the International Railways of Central America showed a loss of $10,649, aggregate net income for the 43 weeks is $656,374 higher at $1,055,915; aggregate operating revenues have increased by $1,091,307 to $11,201,432

Railway Smoke Problems

PROPOSALS for the abatement of smoke emitted by coal-burning locomotives were put forward at the recent annual conference of the National Smoke Abatement Society at Margate. Two papers were read. Mr. W. O. Skeat enumerated changes in locomotive design over a number of years made with a view to improving locomotive performance and obtaining a higher boiler efficiency and also referred to improvement in firing technique and the possibility of direct steaming. Mr. Skeat considers that the production of smoke in running sheds is the "hard core" of the problem. Mr. M. G. Bennett emphasised in his paper the waste of coal involved during the emission of black smoke from the locomotive chimney and said that the procedure known as direct steaming was being actively developed by British Railways. In some cases locomotives were being fitted with valves to permit direct steaming should this method be adopted at a later date as a general policy. One section of the paper dealt with the training of recruits. Mr. Bennett also referred to the capital expenditure involved in the installation of direct steaming equipment and the large-scale adoption of motive power by locomotives other than steam. These two papers are summarised elsewhere in this issue.

Tunnel Reconstruction Difficulties

MAJOR engineering works, involving the partial reconstruction of two main-line tunnels, were described at a recent meeting of the Railway Engineering Division of the Institution of Civil Engineers by Mr. F. E. Campion, Assistant Civil Engineer, Southern Region, and Mr. C. W. King, Assistant Civil Engineer, London Midland Region. Serious settlement had occurred in both cases, and traffic was suspended while repairs were carried out. At Arley Tunnel, on the Birmingham-Leicester line of the London Midland Region, movement had occurred on previous occasions, and a protective pillar had been acquired in the adjacent colliery area. Further settlement took place, and, in 1948, the construction of an invert was begun, and weight was removed from the top of the tunnel by excavation. So serious was the damage, that 300 yd. of the tunnel were converted into an open cutting. Portions of the tunnel have been pressure-grouted, and the drainage has been improved. Bopeep Tunnel, near Hastings on the Southern Region, first showed signs of serious weakness in the summer of 1949. Investigations revealed a fault in the strata in the adjacent area, and the failure of the brick lining was attributed to heavy percolation of water. A reinforced concrete invert was constructed for a length of about 90 yd., and the affected section was lined with cast-iron segments, and the brickwork grouted. Traffic through the tunnel was resumed on June 5, 1950.

Festivities for a New Railway Station

TO the average and comparatively lethargic Briton the excitement among Americans—as expressed by a full week of civic jubilations unequalled since V.J. Day—over the opening of a new passenger station may seem strange, even though the station cost over £1¼ million. The event was on September 17 at Toledo, Ohio, as briefly described in our Overseas columns this week. The city staged a crowded programme of dances, parades, stage shows, band concerts, dinners, luncheons, receptions, and teas. Thirty-seven bands and over 50 marching organisations took part. A lighter-than-air train 450 ft. long, consisting of great balloons modelled in the form of a locomotive, tender and passenger coaches, floated over the crowds. A 200-wagon coal train 1¼ miles long—the "World's Longest Coal Train"—passed through Toledo on its way to the "World's Largest Coal Port" on Dedication Day. The lighter side of the week of celebrations was made up of Toledo Day, Young Toledo Day, Ladies' Day, Glass Day, Dedication Day, and Celebration Day. Glass Day was in honour of Toledo as the glass manufacturing city of the United States.

Articulated Diesel Trains for Egypt

IN recent years the Egyptian State Railways have had to meet serious competition from air transport between Cairo and Alexandria, and, therefore, with the object of providing a fast and efficient train service the administration placed orders with the English Electric Trading & Export Co. Ltd. for 19 articulated five-coach diesel-electric trains, the first of which will be delivered in the near future. They have been designed to obtain a high power-to-weight ratio and are capable of speeds up to 75 m.p.h. The first train completed a trial run from Birmingham Snow Hill to Droitwich and return on December 10. The trains will cover the 130 miles between Cairo and Alexandria in 2 hr. 10 min. including intermediate stops: it is

probable that they will run to Luxor later. Attention was also given to obtaining maximum interchangeability in respect of engines and other equipment common to the rolling stock and main-line diesel-electric locomotives and shunting engines previously supplied by The English Electric Co. Ltd. The power units, electrical transmission, and controls were designed and built at Preston and Bradford, while the all-metal coaches, and underframes and bogies, were built by the Birmingham Railway Carriage & Wagon Co. Ltd. In addition to the articulated stock The English Electric Co. Ltd. also has under construction for the Egyptian State Railways eleven three-coach suburban train-sets.

The Centenary of the Milwaukee Road

ON November 20, the Chicago, Milwaukee, St. Paul & Pacific Railroad celebrated the centenary of the completion of the first five miles of its earliest constituent, the Milwaukee & Waukesha, later known as the Milwaukee & Mississippi Rail Road. By 1857 it had been extended to reach the Mississippi at Prairie du Chien, and from time to time subsequent amalgamations with, or purchases of other railways, and extensions have built up the 10,671-mile system as it is today. The most important extension was from Mobridge in the Missouri River to the Pacific coast at Seattle & Tacoma, a distance of 854 miles completed in 1909. Compared with other transcontinental routes this has easier gradients, and, as it tapped an abundance of water power, some 438 miles, including three mountain passes, were early selected as a pioneer long-distance electrification for heavy traction. Here regenerative braking was used in America for the first time, securing a recovery of 12 per cent. of the total power used, and the general economy secured in operation induced the company subsequently to electrify other sections, notably in the Selkirks. Since its inauguration of the famous "Twin Cities Hiawatha" in 1935, other "Hiawathas" have been introduced on five other routes, 16 rakes of special lightweight stock being required for these six services.

Diesel Locomotive Productivity Report

SOME important recommendations on production and management methods are made in the report* of the productivity team from the British diesel locomotive manufacturing industry which visited the United States of America early this year. When the team returned in February last, little time was lost in preparing the initial draft of its report, and it is unfortunate that, because of the recent printing dispute, its publication has been held up until now. This visit, which we last referred to in our issue of April 28, had special significance in view of the very rapid progress made by diesel railway traction in America in recent years, and in making its recommendations the British team has kept in mind two advantages of the first importance to manufacturers in the U.S.A., namely, the large home market and the single standard gauge of track and generous loading gauge and heavy permissible axle loading. Locomotive manufacturers in Britain, on the other hand, are forced to rely on export markets with a variety of gauges and operating conditions. Members of the team were drawn from six of the British undertakings, covering a wide range of occupations, and they were unanimous in their findings.

In London on December 8, the leader of the team, Colonel Ian A. Marriott, then Managing Director of W. G. Bagnall Limited, gave a summary of the report, laying special emphasis on certain points. Most locomotive firms in America design on the unit construction principle, and it is considered that the adoption of this principle here would be of help to the manufacturing departments at every stage. This method simplifies assembly and saves space in the workshops; moreover, locomotives so designed are readily divided into units for overhaul, and maintenance is simplified. Working on these lines takes time, but it is of interest to recall that the L.M.A. already has such a simplification plan in being. There is intensive use of flame cutting in the U.S.A. and a bold use of welding, while pressed sections are used in place of stock angles and channels. Great care is taken to ensure that standard designs are finalised before production is begun, and they have to remain in production long enough to justify the expenditure on their development and on tools. Machine techniques show little appreciable advance on British methods, and machine tools generally are similar to those used in this country, although when justified by batch quantities special-purpose tools are used, such as those for machining locomotive frames. Sales and service staff must learn to appreciate the importance of the part they play in the general drive towards increased basic standardisation and greater productivity.

Managements in Britain, states the report, should seek the opportunity to examine at first hand American management in action, because the American attitude to managerial responsibility has such an important bearing on productivity. Americans accept as normal competition to hold and improve their positions and this competition becomes even more intense among the more senior executives. Colonel Marriott stressed this point. He was equally emphatic on the vexed question of piecework and time work. Piecework is exceptional in the U.S.A. locomotive industry and full use of labour is made possible by almost complete absence of waiting time. Although as a rule the American worker produces more than his British counterpart, this is found to be due to scientific planning of the use of his time, rather than greater individual effort. Tradesmen are not essential because of simplification of methods. The report recommends that consideration be given without delay to the abolition of piecework in this country and the substitution of an enhanced hourly rate with time study. If the simplification of methods now recommended be achieved craft trades and the apprenticeship system as at present known in this country should be done away with.

* "Diesel Locomotives." Published by the Anglo-American Council on Productivity, 21, Tothill Street, London, S.W.1. Price 3s.

Electric Traction Prospects

INCREASED costs due to present-day conditions make railway electrification in great Britain more desirable than ever, but the unbalanced state of the national economy precludes any immediate possibility of large-scale development in this direction. It was with this warning that Mr. S. B. Warder, Chief Officer (Electrical Engineering) of the Railway Executive, opened his paper on "Electric Traction Prospects for British Railways," read to the Institution of Locomotive Engineers on December 13. Mr. Warder recalled that the overall thermal efficiency of electric motive power was 16 per cent., compared with 8 per cent. for steam, and proceeded to review what had been done so far in this country to take advantage of this higher efficiency. Two world wars had struck a grievous blow at the development of electric traction in Great Britain, and, excluding the Southern Region, only 0·94 per cent. of the total route-mileage had been electrified. The corresponding percentage on the Southern was 32 per cent., a proportion similar to that found on the Continent, although electrification abroad was often governed by non-railway considerations such as availability of coal, oil, and water power, or international economic policy.

The Railway Electrification Report (1950), which had been prepared under the Chairmanship of Mr. C. M. Cock, and was about to appear, would show that 43·4 per cent. of the route-mileage of British Railways had a traffic density in excess of what was computed would justify electrification on economic grounds, so that 6,500 route-miles should be electrified instead of only 1,000 as at present. To convert one-third of the total route-mileage of British Railways would be an undertaking of tremendous cost, requiring many years to complete.

It was a peculiarity of railway electrification that once it had been begun it was necessary to continue in order to reap maximum advantage from the initial expenditure.

That was why the Southern Region in 1947 was anxious to proceed with electrifying a further 284 route-miles on the Central and Eastern Sections in order that these areas could be exclusively operated by electric trains. At present a steam mileage of some 6·5 million train-miles a year was being operated over the whole of the electrified area, or 20 per cent. of the total steam train mileage.

In any given circumstances either steam or electric motive power might be the more operationally efficient, and the experience gained by the Southern Railway enabled a valid comparison of the two systems to be made. Mr. Warder said that, although Southern Region steam and electric passenger coaching vehicles were approximately equal in number, for every 1·6 million steam passenger train-miles run per month, 3 million electric train-miles were run. Relative problems of repair and maintenance formed a useful basis for comparison between steam and electric motive power. The average overall availability of steam locomotives on the Southern Region, expressed on an annual basis, was 80 per cent. Electric rolling stock had a higher availability, averaging some 93·5 per cent.

Three experimental electric locomotives had been built for operating train services without set formations on the Southern Region, as well as freight services within the electrified area. These machines already had a high availability (a figure of 77·5 per cent. was quoted for No. 20003), and this would be improved when a settled maintenance routine had been established. Each locomotive was running an average of 6,000 miles a month on selected freight services and the Newhaven boat trains. Mr. Warder's paper gave the following examples of savings in time effected both by shorter sectional times and the elimination of stops to take water:—

Route	Miles	Type of service	Steam schedule (Min.)	Electric schedule (Min.)
Chichester–Norwood ...	63½	Freight	177	157
Polegate–Norwood ...	61½	,,	168	150
Norwood–Horsham ...	31½	,,	85	71
Hove–Chichester	27½	,,	75	58
Victoria–Newhaven ...	57	Passenger	79	68

The detailed description of maintenance procedure for electric stock in Mr. Warder's paper emphasised the flexible system of train operation in force, whereby units were not based on a particular depot, and need not necessarily work to a depot for a prolonged period. A Central Records Office kept card records of all work done on all units, so that no unit should run for excessive periods without maintenance attention. Heavy overhaul was carried out on a mileage basis—100,000 miles for suburban and 80,000 miles for express stock—and mainly concerned the mechanical parts and rotating machines. Hitherto electrical control equipment had been maintained during day-to-day inspection, but experience had shown that certain sources of failure might be eliminated by a detailed overhaul at fairly long intervals. In due course it might be possible to carry out the electrical general overhaul when the stock was out of service for repaint, every seven years. In this connection, Mr. Warder included the development of sealed control equipments, capable of running for years without attention, in his concluding review of desirable subjects for extended study.

Every effort was being made today to keep operating costs as low as possible against the rising tide of costs. While further electrification in present circumstances might come very slowly on the grounds that "we cannot afford it," the time must arrive when it would be a case of "we cannot afford not to." Mr. Warder drew special attention to economies resulting from the work that can be done by electric traction with so little attention in the shops, and included in his paper a table showing that in 1949 the Southern Region employed a staff of 3,406 on repair of steam locomotives, but only 650 on electric and diesel-electric motive power upkeep. Maintenance and running costs had been £10,753,000 for steam traction, and £4,885,000 for electric trains, with depreciation charges of £662,182 and £380,643 respectively.

Money and time should be found for some further electrification schemes, Mr. Warder concluded, in order to reduce operating costs and assist the railways to pay their way. His proposals were completion of the Eastern and Central Section schemes on the Southern, and electrification from London to Tilbury and Southend. Young engineers now embarking on a railway career were in an unique position in being the first of the truly dual-purpose engineers, and thus should be able to ensure, with complete impartiality, that both forms of motive power were given a fair chance in pulling British Railways into relative solvency.

G.N.R.(I.) Closure Authorised

THE stockholders of the Great Northern Railway (Ireland) have authorised the directors to close the railway "at the earliest date conformable with the law." Lord Glenavy, Chairman of the company, told more than 500 stockholders at an extraordinary meeting in Belfast on December 8 that the Northern Ireland Minister of Commerce had informed the Board that he was considering the company's position but would not have a proposition to put forward before the date of the meeting. No communication had been received from the Minister for Industry & Commerce in Dublin.

Since the meeting, it has been announced that the talks on the G.N.R.(I.) between the Northern Ireland Minister of Commerce and the Parliamentary Secretary to the Minister for Industry & Commerce in the Irish Republic have been resumed, in Belfast. It is therefore thought likely that the directors will refrain for the moment from carrying into effect the shareholders' sanction to cease operations. There is a feeling that the Governments in Belfast and Dublin may jointly aid the railway until a road-rail co-ordination scheme in the North is submitted.

The statement made by the Northern Ireland Minister of Commerce in October was the first intimation, Lord Glenavy informed the stockholders last week, that the Government White Paper of 1946, providing for a merger of the G.N.R.(I.) with the U.T.A., was to be abandoned. No action had been taken to implement the Milne Report of 1948 in its application to the G.N.R.(I.). Reversal of a policy for which the company had long been led to prepare necessitated an immediate review, and the lack of any other effective policy, a radical adjustment of the financial outlook, on the basis that the company had been thrown back on its own depleted resources.

Lord Glenavy disclosed that at November 30 there was a surplus of liquid resources of less than £1,000, after providing for debenture interest in the first half of the coming year but before providing for commitments in respect of the superannuation fund, workmen's compensation payments and the County Donegal Railways, which involved present outgoings of some £25,000 a year. The analysis made at October 31, showed a larger surplus, as it was prepared on the basis no longer valid, that the company was a going concern. Accordingly, commitments for stores and materials as a going concern had now to be included as specific liabilities to be met out of liquid resources not so treated in the October analysis.

As stores and materials were used, new commitments had to be entered into. Payment for deliveries under such new commitments, with payment for other working costs, would then involve a loss, which on the present scale of operations would mount up to the rate of some £8,000 a week no longer replaceable from liquid resources. If the company were to proceed next year on that scale there was no prospect before the summer that the rate of drain on cash would be reduced. Assuming the shareholders were willing to continue making sacrifices to sustain the present levels of employment and services over the Christmas period a continuance of operations on their present scale after that period would bring the company to a stage where it had to rely on non-liquid assets to meet liabilities dischargeable in cash, even though no new orders were being placed for materials purchasable in bulk which were essential for proper maintenance. The company's stocks of such materials were running down; if they were

not replenished the condition of the line would soon deteriorate. From the beginning of next year the company would not be able to pay out more than it took in through receipts and even if no materials were ordered for renewals and maintenance, receipts had to be charged with payment for the coal, oil and other consumable stores.

A weekly loss of £8,000 would mean that the employment of large numbers could not be continued. The means for real improvement in the company's position was more and more traffic, not fewer and fewer services. A liquid balance of less than £1,000 with which to confront a loss of £250,000 a year gave no time for delegated inquiries or piecemeal panaceas.

Lord Glenavy said that there had been on effective co-operation from Government departments; apparently the G.N.R.(I.) is regarded as a party which it would be irrelevant to consult on questions so technical as those in devising a stable future for the system. The steps which the company must now take may be affected by legal provisions but what legal provision enables a company with no liquid resources to pay out £8,000 a week more than it takes in?

The position of the Great Northern is the more deplorable in that the company has long had an enviable reputation. It is melancholy reflection that so well-managed and enterprising an undertaking should be brought to its present state by political procrastination. The company has acted throughout with realism and in good faith, expecting fair treatment from the implementation of the 1946 White Paper or the Milne Report. No blame can attach to it; the grim prospect facing the company has arisen in large part as a result of governmental dilatoriness—cold comfort for its loyal officers and staff and the stockholders who have shown more than usual restraint. Not least to be affected must be the trading community north and south of the Border whom the company has well served for more than seventy years.

New Eastern Region Signalling

THE signalling installed between Liverpool Street and Gidea Park in connection with the electrification to Shenfield, the first part of a description of which appears in this issue, represents one of the largest areas in Great Britain to be equipped with power and automatic signalling, and with the extensions to Chelmsford and Southend compares in length with other important installations such as that between York and Darlington. It is also of special interest from the technical and operating points of view and covers a section of route long provided with an exceptionally complete form of manually worked signalling. When modifications were undertaken in 1895 to the layout at the Liverpool Street terminus, originally opened for service in 1874, the Great Eastern management decided to replace the ordinary block there and throughout its suburban district generally by the Sykes lock-and block, trials of which had been begun, superimposed on Tyer's block telegraph, in 1882, between Hackney Downs and Clapton, under the unusual name of Sykes "electric slotting". This particular form of apparatus was not chosen for general adoption, but a much more complete design incorporating both "train accepted" and "train on" indications, with semi-automatic operation of the latter, in the event of failure to send or acknowledge "train entering section". This type of Sykes instrument, later adopted by the London Tilbury & Southend but by no other line, together with very complete points, cross over and junction interlocking, Rule 39 approach controls, and other improvements, represented the highest development of the system. When the Telegraph Superintendent, Mr. F. T. Hollins, read his paper on block interlocking before the Institution of Electrical Engineers on January 28, 1897, he said that the work was nearly finished, there being then 78 signal boxes equipped and 1,022 levers interlocked with the block. There were 400 of his friction clutch type rail contacts, or treadles, in use, and the failures in six months had been five in 5,856,000 train operations and this figure was being much reduced. Speaking of the equipment again soon after he said it was "probably the most complete, the most reliable and secure method of controlling and expediting trains ever provided on any railway in the world". The results spoke for themselves and the remarkable freedom from accident always enjoyed by the Great Eastern suburban lines afforded excellent testimony to the efficiency of arrangements which have now had to make way for more modern methods. The most serious accidents that have occurred during the years since the Sykes block was installed in the area, such as that at Hackney Downs in 1902, had nothing to do with the block working.

Although progressive in the matter of adding every improvement to the manual signalling to safeguard against the chance of mistake, the Great Eastern was conservative towards power and automatic signalling. It is true that it could take the credit for installing at Granary Junction, Bishopsgate, the first power signal box, which was of the electro-pneumatic type, to do regular service in this country, the earlier all-electric work of Timmis at Earls Court, on the District line, and in the South Wales docks, having had no permanent result. This was in January, 1899, and the box is still in service with the original American turn-handle pattern of lever frame. Despite its successful working, no further power interlocking was put in by the Great Eastern, although it had many locations, not to mention Liverpool Street, where its use might have been expected to appeal. When the "intensive" service, brought into operation in 1920, was being worked out, it was at first proposed to adopt a certain amount of automatic and semi automatic signalling with track circuit control, but this was not done. The desired increase in headway, which was considerable, was achieved by adding outer home signals relocating others, providing banner repeating signals, altering the Sykes block plunger controls, so changing the section clearing points, and installing a certain amount of local track circuiting, of which the G.E.R. until then had made comparatively limited use. It is probable, however, that, had there been no war in 1914, some power signalling would have made its appearance on these lines by that time.

The long continuance of manual operation there has resulted in the eventual adoption of the latest improved equipment and the resignalling of the running movements to meet the changed character of the traffic resulting from electrification. When the work was being planned Mr. A. E. Tattersall was Signal & Telegraph Engineer of the then Southern Area of the L.N.E.R. He had for some time been known as an advocate of the panel type of apparatus as opposed to the power frame, and the whole of the new equipment follows his views in this respect, although the war unfortunately prevented it from being carried to completion under his direction. Discussions on the relative merits and disadvantages of these two systems, if they may be so described, have been frequent among signal engineers and traffic officers, and recently seem to have turned appreciably more in favour of the panel conception, not only in this country but elsewhere, to judge by the reports submitted to the recent International Railway Congress in Rome. Liverpool Street is the first large terminal station here to be operated from a panel, and the next large location at Stratford controls somewhat similar complexities of traffic movements, so that valuable experience will soon be available on which to form a direct comparison, from all points of view, between this type of working and the older form met with at comparable stations and junctions on the Southern Region.

Without entering into the panel lever frame controversy, however, there is no doubt of the fine standard of signal engineering achievement represented in these new Eastern Region installations. So fundamental a change in the signalling of a route of this kind, especially when many changes in the layout have also to be made, cannot be effected without much temporary stage work which, although not specially apparent when looking at the final installation, calls for considerable forethought, skill and care. This has been so in this case, and it reflects great credit on all concerned on the staff of the Signal & Telecommunications Engineer, Mr. A. Moss, under whose direction the work was resumed and carried to completion.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Railway Efficiency

November 20

SIR,—Evidently, Mr. J. H. Laundy, in your November 3, 10 & 17 issue, does not know that, before the 1914-18 war, the railways always claimed that they were carrying 1,800 million passengers a year. They have since been down to about 950 million. In 1913, the goods tonnage was 364 million. Excepting the peak year of the recent war, it has never since touched 300 million. In those days practically all the traffics—which have since greatly increased—were carried by railway. Commercial motor transport was almost non-existent.

Mr. Laundy should turn his studies to reducing the present exaggerated working costs. At the present high prices of coal, heavy savings could be made by avoiding the running of hundreds of excursions—by reducing ordinary fares to motorcoach levels, and filling the ordinary trains. At the beginning of the year, a similar experiment on a Sunderland branch resulted in the average daily number of passengers jumping from 15 to 140—an increase of 900 per cent. ! If this experiment had been extended throughout the lines, a substantial increase in passenger and miscellaneous receipts would undoubtedly have been recorded.

Until about the beginning of this century, working men could get to America for a fare of £3 including food for six days and sleeping accommodation. Our nationalised railways now charge them as much to travel from London to Scotland—without food or bed ! Evidently, the present management is trying to bar the working classes and other low-paid people from using the railways.

Yours faithfully,

E. R. B. ROBERTS

Eynesbury, St. Neots

Steam Behaviour

November 15

SIR,—I am a locomotive enthusiast and a bedridden chronic invalid. Advice on the following will be welcome.

(*a*) Is it possible to find out, with any degree of accuracy, what happens to the steam during its passage from boiler to cylinders? During this passage it is expanded, does work, reduces in pressure, is superheated, and changes from a vapour of unknown dryness to a gas.

When considering the expansion I use the general equation:—

$$pv^n = p_1v^n{}_1 = p_2v^n{}_2 \quad . \quad . \quad . \quad (A)$$ And, as $p = \frac{p_1v^n{}_1}{v^n}$ we get:

$$W = \int_{v_1}^{v_2} \frac{p_1v^n{}_1}{v^n}\,dv \quad . \quad . \quad . \quad (B)$$ W = Work done in expanding from boiler pressure to steam chest pressure.

(*b*) In the case of an express engine cutting off steam at 20 per cent. of stroke, what back pressure (absolute) should we expect?

(*c*) What is the specific heat of steam superheated under the conditions described in (a)?

Yours faithfully,

TITUS LAWRENCE

[(*a*) Our correspondent is mistaken in supposing that any work is done by the steam during its passage from boiler to cylinders. This is essentially a throttling process. The total heat or enthalpy of the steam remains constant during throttling, the pressure is reduced, but no external work is done.

If there is no superheater, and if the steam is wet at entry to the steam pipe or regulator valve, it will become drier, and possibly superheated, as a result of the throttling process. The change of state can easily be calculated with the help of steam tables, or more simply by following a line of constant enthalpy on a Mollier diagram, provided both the pressure and dryness at entry to the steam pipe and also the steam chest pressure are known.

With a superheated locomotive the process is rather more complicated as the steam flows through the superheater tubes on its way from the regulator valve to the cylinders. During this passage, the steam takes up a further amount of heat from the boiler flue gases which results in an increase of enthalpy. It remains true to say, however, that the effect of any throttling is to cause some preliminary drying or some slight additional superheating over and above that achieved by the heat transfer through the superheater elements.

The expression $\int p\,dv$ quoted by our correspondent only gives the work done *during the expansion stroke when steam or gas expands in a fully resisted manner in an engine cylinder*. It does not give the work done in a steady flow process.

(*b*) The average back pressure exerted on the piston when the exhaust port is open will depend on the size and layout of the exhaust ports and passages. For a well-designed engine it should only be slightly above atmospheric pressure.

(*c*) The specific heat of superheated steam is not a constant quantity but depends both on pressure and temperature. Reference should be made to steam tables for the appropriate value.—Ed., *R.G.*]

Eight-Car Trains on the District Line

October 1

SIR,—Some months ago the London Transport Executive announced that it hoped shortly to introduce more eight-car trains on the District Line.

I have not been able to check an entire day's operation to see whether the "eights" have a working majority over the "sevens" and "sixes", but from observations made during the rush-hours it would appear to me that what is required is not so much a general levelling up to the maximum figure as a re-diagramming of those eight-car sets already in existence.

On Wednesday, September 27, I observed the following at Charing Cross (westbound):—

Time p.m.	Destination	Working No.	Cars
6.10	Wimbledon	65	8
6.12	Ealing	20	6
6.14	Richmond	36	6
6.16	Hounslow	77	6
6.20	Ealing	23	6
6.22	Wimbledon	47	6

The foregoing is by no means an isolated instance. The eastbound train I frequently use from Putney Bridge in the morning (working No. 08—time due out 8.37 a.m. approximately) has recently had allocated to it one of the newest eight-car formations; often, however, it has turned up two short of its quota, and to make matters worse the following train (working No. 64) has undergone a similar pruning operation.

Surely the logical working of multiple-unit stock, if passenger comfort and reasonable time-keeping are the real objectives, is to strengthen trains in the peak period, and reduce to the lowest practicable figure (to save vehicle-mileage) in the off-peak.

One realises that, on services operating with a short headway, a slight mishap necessitating the withdrawal of a train has serious repercussions of coach-working, but even allowing for this handicap, I still feel convinced that the District Line of L.T.E. is due for some overhauling.

Yours faithfully,

J. E. L. SKELTON

9, Keble House, S.W.15

[Our correspondent should remember that the claims of the eastern extension of the District Line to Barking and Upminster have also to be met. At 6.10 p.m. at Charing Cross the worst of the peak is over. Observations between, say, 5.30 and 6 p.m., might reveal a greater proportion of eight-car trains.—ED., *R.G.*]

THE SCRAP HEAP

Private Enterprise

Six men travel up and down regularly between London and Brighton in a first class compartment, but only one has a first class season ticket. His five companions pay him 6d. a trip each day. In return he pays five excess fares of 3s. 7d. each if a ticket inspector challenges them. He claims to show a small but steady profit each week. —*From the "Daily Mail."*

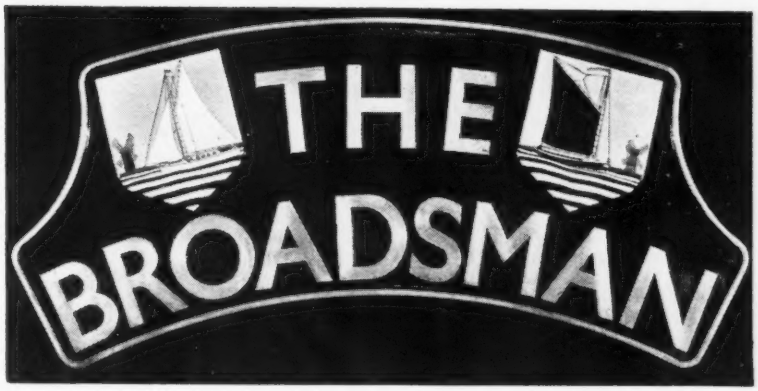
Buddicom Engine for the Festival

A locomotive which typifies the impact that British engineers of 100 years ago had on railway development abroad will be shown at the South Bank exhibition of the Festival of Britain in 1951. It is a 2-2-2 Buddicom express passenger engine belonging to the French Railways, and built by Allcard, Buddicom & Cie, at Chartreux, near Rouen, in the early 1840s and still in running order. Though its equally famous contemporary, the Crampton, achieved its greatest fame only in France, the Buddicom was to be found during the last and part of that century in Italy, Spain, France, Canada, and elsewhere, and was long a favourite in this country, where it was known as the Crewe type.

The association of three men was responsible for the development and wide use of the Buddicom. They were Joseph Locke, one of the great railway civil engineers, who designed railways in France, Spain, and elsewhere; Thomas Brassey, perhaps the greatest figure among public works contractors; and William Barber Buddicom, one-time Locomotive Superintendent of the Grand Junction Railway.

The engine, recently fully overhauled in the French locomotive shops, will leave Paris early in January, 1951, and will travel to Dunkirk, where it will be shipped on the train-ferry to Dover, whence it will make its journey to Bricklayers Arms Station.

New Engine Headboard for the "Broadsman"



Redesigned headboard carried by the locomotive of the "Broadsman" running between Liverpool Street and Cromer

Practice Bomb on Railway

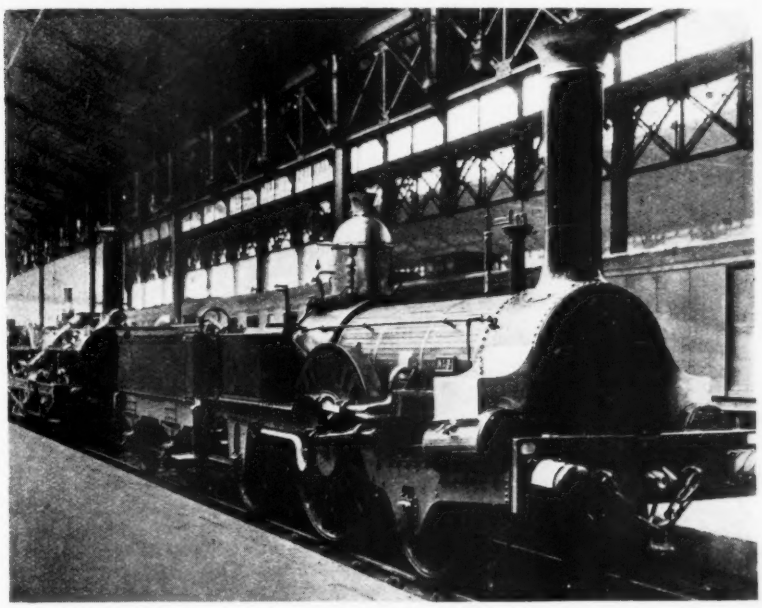
A 1,000-lb. practice bomb, filled with sand, fell from an aircraft recently on the Southern Region track between Hook and Winchfield, Hampshire, delaying traffic between London and Basingstoke for three-quarters of an hour.

A spokesman of the Ministry of Supply said that the aircraft was a Lincoln flying from its base at Farnborough. The bomb, it was thought, had been accidentally released.

A platelayer saw the bomb fall and the line was closed six minutes before the 11.2 a.m Bournemouth to London express was due to pass. Displaced earth slightly lifted the up local line. The bomb was buried by order of the Air Ministry and an inquiry was begun. —*From "The Times."*

Proper Pride

A correspondent who has lately moved from London to the Mendip Hills writes that he recently returned from Paddington to Bristol in a doubtfully clean train, and in a filthy one from Bristol to Yatton, where he found a branch train which was spotlessly clean. There were no dust or scraps of paper on the seats or floor and the door handles were brilliantly polished. He told the guard what a pleasure is was to see everything so clean, and he replied: "Well, you see this is *our* train." Our correspondent remarks that it is pleasant to live in a locality where this spirit pervades.



Buddicom locomotive to be shown at the South Bank exhibition in London next year, on view in the Gare St. Lazare, Paris (see paragraph above)

Passing of the Double-Decker

Hybrid, farewell,
They sound thy knell,
Thou art unique,
My precious freak.
Calamity!
No one will see
Them crowding in
Thy kith and kin.

No "up or down?"
For trips to town;
No more stiff necks
From double-decks;
No noisy treads
From "overheads";
No stairs to climb,
No wasting time.

But, am I glad,
Or am I sad?
Who wanted so
The *status quo*?
And is it fair
To smother, ere
It's scarce begun,
The rhymester's fun?

A. B.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Germiston as a Traffic Centre

Germiston is the most important junction in the Union, and handles over 700 trains a day. It is the focal point for trains from practically all the Provinces and Mozambique. As part of the remodelling scheme of this station, the marshalling yard has been moved farther from the passenger station and is provided with flyover junctions.

As the busiest transhipping centre of the Union, Germiston handles daily about 500 wagon loads of goods, which must be sorted and re-routed to their destinations. This depot also controls four subsidiary marshalling yards at Angelo, Elandsfontein, Elsburg, and India Junction, and many private sidings serving adjacent industrial areas.

In July, 1950, the Germiston yards handled 1,829,000 tons, Elandsfontein 335,000 tons, Elsburg 638,000 tons, and India Junction 72,000 tons, while 2,650 wagon loads were loaded out from private sidings. To handle this traffic the Germiston locomotive depot has 224 steam locomotives on strength and a staff of 1,700 men of different grades. In 1950, the passenger booking office at Germiston sold 1,647,000 single and return tickets and 126,595 seasons, and the station staff handled 240,000 packages of parcels and luggage, and 50,000 gal. of milk.

Coincident with the new developments at the passenger station and goods yards, improved facilities have been provided at the mechanical workshops to enable them to cope with the increased wagon repair and maintenance work. Some 800 wagons are repaired each month at the Germiston shops, and equipment to the value of £1,400 is salvaged from them for use on other work.

Although the heavy repair and maintenance programme leaves little time for the construction of new rolling stock in 1949, the Germiston workshops turned out 50 bogie dairy wagons and have now begun to construct 100 iron-ore hoppers of 50-ton capacity.

WESTERN AUSTRALIA

Wagon Programme

Following Government authorisation of a wagon replacement and expansion programme covering 4,160 wagons (equivalent to 4,610 four wheel wagons) contracts have been let to Australian firms for the manufacture of 2,950 of the single vehicles in the following classes:—

Sheep wagons	300
Cattle wagons	300
High-sided open wagons	600
Medium-sided open wagons	500
Low-sided open wagons ...	250
Covered louvred wagons	1,000
Total	2,950 (all four-wheel)

The total cost involved, excluding wheels and axles, exceeds £3,858,000.

Tenders for the remainder of the programme, comprising 450 bogie and 760 single vehicles in the undermentioned categories, are returnable shortly: High-sided open wagons 108, covered fully-louvred wagons 180, flats 72, cattle wagons 90, all bogie, covered, upper portion louvred but adaptable for bulk wheat loading 710, special wagons, refrigerated, etc., 50, the last two varieties being singles. The construction of the wagons intended for the carriage of bulk commodities will allow of either end or side tippling, or side unloading.

The wagon programme is designed to replace wagons 40 years old or more, to cope with traffic expansion and to meet the more concentrated demand resultant of the 40-hr. working week, to June 30, 1951, but for reasons associated with material supplies and manufacturing capacity, it is expected that delivery will not begin until a little after that date.

TASMANIA

One-Day Strike

A one-day stoppage of work on the Government Railways took place on October 30. It was called by the Australian Railways' Union and the Australian Federated Union of Locomotive Enginemen to support the claim of the Victorian and South Australian Railwaymen for passive time (which is already paid at normal rates) to be taken into account in computing overtime and for overtime to be paid after eight hours on duty.

More than 3,000 tons of goods were moved on Sunday, the day before the strike, and the Transport Commission also arranged alternative road services for passengers. These measures helped greatly to alleviate the effects of the strike.

It was the first time in the history of the railways that all rail services were paralysed by a strike.

New Planning Committee

A Planning Committee has been set up to provide a medium for discussing projected developments in the transport services of the Commission. It comprises heads of departments with certain executive officers and representatives of the Unions. The general purpose of the Committee is to provide a medium for joint consultation on all phases of railway and road activities, except industrial wages and conditions, and it is hoped that it will result in great public goodwill towards and support for the railways.

The first meeting of the Committee was recently held in Launceston under the Chairmanship of Mr. A. K. Reid, Secretary of the Transport Commission.

Courtesy Campaign

A campaign to foster the success and popularity of railway services by giving prompt information, advice and help to passengers and others, has been launched. One of the measures adopted is the regular inclusion of suitably-worded precepts on the front page of the weekly notice.

New Parcel Rates

Schedules of revised parcels rates have been put into effect. Not only have the rates themselves been adjusted, but alterations have been made to the zone distances and the lower weight scales, which are now on a comparable basis with road transport. Where road distances are shorter, the railway rates have been made to correspond.

CANADA

North Vancouver Development

It is stated in Vancouver that the Canadian National Railways have a scheme for a multi-million dollar harbour, rail and industrial development in suburban North Vancouver on the north shore of Burrard Inlet. It is planned as an ultimate link with an extension of the Pacific Great Eastern Railway from its southern terminus at Squamish, thirty miles north of Vancouver.

The report added that the British Columbia Government will begin work next year on an extension of the Pacific Great Eastern from Squamish to North Vancouver. The project would provide a vital defence link to Northern British Columbia and Alaska, permitting fast shipments to Prince Rupert, *via* the P.G.E. to Prince George. An article on the Pacific Great Eastern Railway appeared in our March 24, 1950, issue.

UNITED STATES

New Station at Toledo

On September 17 the new Central Union Terminal at Toledo was opened with full ceremony and amid a week of rejoicings. It was designed and built by the New York Central administration, but is also used by the Baltimore & Ohio, Chesapeake & Ohio, and Wabash Railroads. This is the second large undertaking recently completed at Toledo, the other being the modernisation of the railway port facilities described in the December 23 and 30, 1949, issues.

In connection with the opening of the station, costing over £1,750,000, the railways arranged an exhibition of new locomotives and rolling stock. Each day for a week excursions were run enabling the public to see the various railway facilities at Toledo. A six-coach train was at first provided, but so great was public demand and interest that eventually four 15-coach trains were required. As many as 70,000 visitors passed through the new terminal in a single day.

Toledo is the centre of the U.S.A. glass industry, and the new station con-

tains many specimens of the products of this industry, including a large glass mural 50 ft. long and 4 ft. high over the main entrance doorway, depicting a map of the world superimposed on the words "Toledo—Glass Centre of the World." The principal speakers at the inaugural ceremony were Mr. G. Metzman, President of the N.Y.C.R.R., and Admiral Chester Nimitz.

ARGENTINA

Strike on Principal Railways

During November, a strike originated on the General Roca Railway, but spread rapidly to all the principal railways. The trouble began among level-crossing keepers and carriage cleaners of the Buenos Aires and La Plata sections of the General Roca Railway, who ceased work and stated that they would not return until their minimum wage was increased from 400 to 550 pesos a month. Although this movement was at once disowned by the Railwaymen's Union and the General Confederation of Workers and denounced as the work of professional agitators, it nevertheless began to affect other sections of the same railway and soon spread to the other railways, except the General Belgrano. Other grades, principally guards and motormen, joined the movement, with the result that all passenger traffic on the local section of the General Roca Railway was suspended, while on the Mitre and Sarmiento Railways a reduced service of electric trains ran without guards and driven by inspectors. The Ministry of Transport issued a statement saying that the points at issue were already under study and finally ordered the strikers back under pain of dismissal. The next day services were normal.

CYPRUS

Future of Railway in Doubt

The Government-operated railway, which runs for 71 miles from the mines in the mountains to the port of Famagusta, is in the market. Unless private enterprise can take it over and work it at a profit, it will be scrapped.

Last year it carried 78,000 tons of goods and, between Nicosia, the capital, and Famagusta, 164,000 passengers. Its operating cost for the 3,500,000 ton-miles was nearly 4½d. per ton-mile. Over the 44 years of its existence the average annual loss has been £4,100.

Most of its rails are 40 years old: and are not expected to last beyond the end of next year. Its locomotives are also old. Track renewal would cost £230,000, and re-equipment with diesel locomotives a further £160,000. Incidentals would bring the total cost of modernisation to £400,000. It is estimated that if the railway was modernised it would have to make £28,000 a year over and above running expenses before it would pay. An official statement says: "Without protection from competition from road transport there is no hope that the railway could be made to pay by attracting more traffic. The railway, as a common carrier, must accept everything that is offered, but road hauliers are free to pick and choose; they can concentrate on the more valuable goods which are able to stand higher transport costs and they can wait for full loads."

The Government has not as yet come to a final decision. "It has been suggested," the statement says, "that the railway could be operated so much more economically by a private company that it would show a profit even with unrestricted competition from road transport. It is, indeed, conceivable that private enterprise might run the railway profitably if the service were restricted to goods traffic. . . . No offer to purchase the railway has been made but careful consideration would be given to any serious proposals by responsible persons."

ITALY

Florence-Faenza Line

Reconstruction of the war-damaged Florence-Marradi section of the trans-Apennine Florence-Faenza line, and electrification of the whole line, are being considered. Reconstruction was discontinued two years ago for lack of funds, after completion of the Marradi-Faenza section. Faenza is on the Bologna-Ancona-Bari-Brindisi main line. The Florence-Faenza line, if electrified, will be a relief to the busy Florence-Bologna direct line, besides relieving the overworked facilities for handling goods traffic at Bologna. The whole line is heavily graded, attaining an altitude of 1,760 ft. between Marradi and Florence.

TRIESTE FREE TERRITORY

Re-Routing of "Simplon-Orient"

Acceleration of the "Simplon-Orient Express" next summer, as agreed at the recent International Timetable Conference and referred to in our October 20 & 27 issue, will allow the train to call in both directions at Trieste Central, where it reverses. The importance of serving Trieste directly has increased through the economic recovery of that port; the Allied occupation does not seem to have occasioned much travel by the "Simplon-Orient" Express.

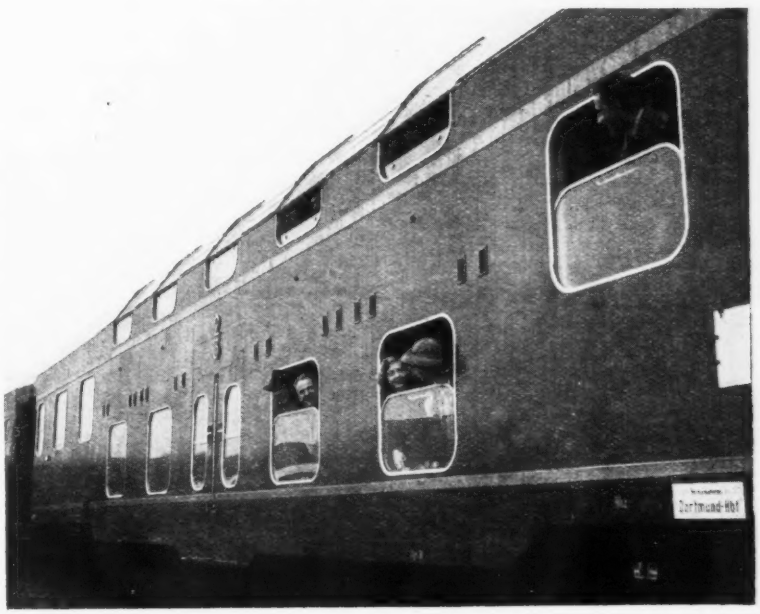
NETHERLANDS

Electric Power Shortage

Shortage of electric power in the Netherlands has led to restrictions on use of current in electric trains, in which electric heating and lighting are now forbidden during rush hours. Provided no further restriction is necessary, these limitations are to remain in force to the end of January. The present shortage is a result of wartime devastation of power stations throughout the country by the Germans, particularly heavy in the south.

Reconstruction of power stations and the distribution system has been partly delayed because it was foreseen in 1946 that increased power requirements of expanding industry would necessitate not only reconstruction but enlargement of the plants concerned.

German Double-Deck Coaches



Three-coach double-deck set placed in service by the German Federal Railways between Dortmund, Frankfort, and Fulda

Repairs to Hurstbourne Viaduct, Southern Region

Demolition of weak jack arches after filling spandril cavities with lightweight concrete, and laying of concrete slab to support lowered track throughout the length of the structure

HURSTBOURNE Viaduct, situated between Hurstbourne and Andover, and carrying the main Southern Region line to the West of England across the Bourne Valley immediately west of Hurstbourne Station, was opened in 1854. The viaduct consists of nine brick arch semi-circular spans of 46 ft. The maximum height of rail level above the ground is about 65 ft.; the ballasted tracks over the viaduct have been supported on five longitudinal jack arches springing from spandril walls built up from the arch spans and piers.

Interior of spandril under six-foot showing crown of main arch

The condition of the spandril walls and jack arches, which are of relatively light construction, has gradually deteriorated since the building of the viaduct nearly a century ago, and, as stated in an editorial in our last week's issue, fairly extensive repairs have become necessary. A simple solution would be to replace the walls and jack arches with reinforced or mass concrete, but a series of comprehensive tests recently carried out indicated that additional weight at a high level would be undesirable and might tend to cause side sway of the viaduct as a whole.

It was therefore decided that the required strengthening should take the form of:

(a) Introducing solid concrete filling to the spandril cavities of each arch;

(b) The laying of a continuous, 9 in. thick, reinforced concrete slab throughout the length of the viaduct; and

(c) Lowering the track about 2 ft. to prevent an increase in the dead load as a result of works under (a) and (b).

The accompanying diagram shows in section the five weak spandril arches to be demolished after the solid filling of the cavities underneath has been completed. The drawing also shows in section the new reinforced concrete slab laid to falls to facilitate drainage and the lowering of the rails over the viaduct. This latter work involves regrading the approaches to the viaduct from east and west.

To carry out the work with reasonable expedition it was necessary to remove the up line for about half-a-mile to provide working space on the viaduct and re-grade the approaches. This singling was brought into operation on October 22.

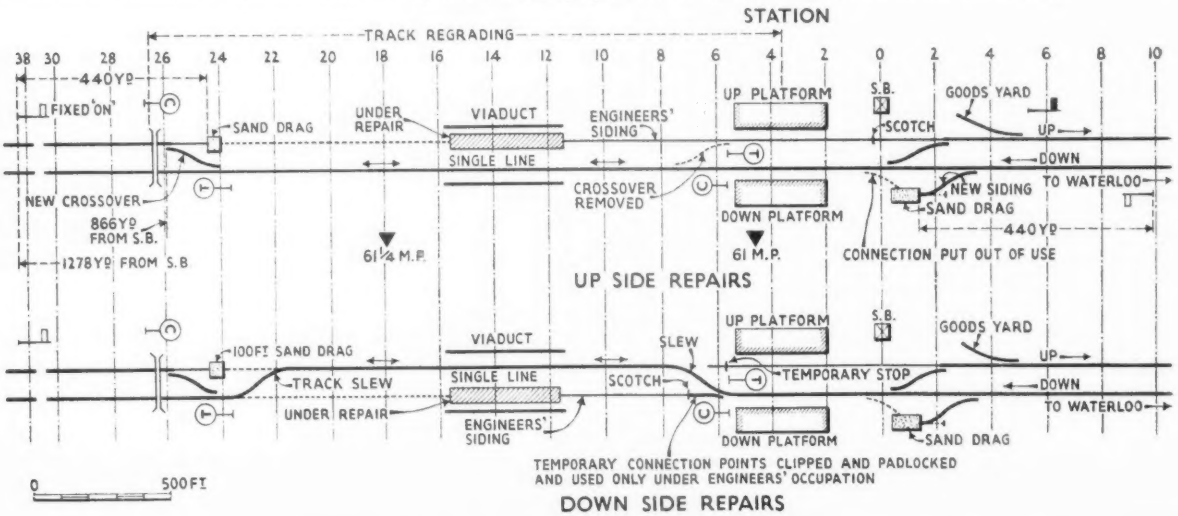
Single-Line Working

The layout and signalling arrangements for the single line working provide for non-token operation, with the signalmen at Hurstbourne having control of both ends of the single line and capable of "free acceptance" in either direction. At the same time a speed restriction of 15 m.p.h. was imposed. No appreciable delay has resulted.

To maintain the stability of the structure while half of the width of the viaduct only was subject to live loading, it was necessary to fill the spandril cavities without removing an appreciable quantity of the existing fill over the viaduct.

Timbered shafts 15 ft. by 5 ft. in plan were sunk over each pier and the spandril arches broken through. Concrete was then poured from a mixer at the top and by this means three arches each 28 ft. long (one under the six-foot and two smaller arches under the up track and cess) were filled up solid.

This work was followed by the construction of a bag wall (dry mixed sand and cement) in a trench alongside the sleeper ends of the single line to retain the filling under the single line, while the remainder of the fill on the viaduct was removed. As the excavation proceeded, following the bag wall construction, the brick deck over the spandril arches was exposed and all the brickwork (most of which suffered from perished mortaring) in the arch rings and backing was pulled up and removed, and the resulting void filled up with concrete which was extended to the crown of the main arches.



Track layout for single-line working over viaduct

The concrete used for both these filling operations was a light weight type made by using coarse and fine foamed slag as concrete aggregates, giving a concrete nearly 40 per cent. lighter than normal stone and gravel aggregates.

On top of the lightweight concrete filling construction of the reinforced concrete slab (in normal concrete) has begun. This will later be waterproofed by a liquid bituminous compound and layers of roofing felt which in turn will be overlaid with protective concrete. On completion of the slab construction, the single track will be slewed from the down side to the up side on the new slab, to enable the other half-width of the viaduct to be similarly treated.

Due to lack of space, the rate of the supply of constructional material to the viaduct site has had to be arranged in small quantities at frequent intervals by the running of a daily train from which material is off-loaded while it stands on the single line for a scheduled period each day (about one hour in the morning immediately before the passing of the down "Atlantic Coast Express").

The amount of material to be handled may be gauged from the following quantities:—

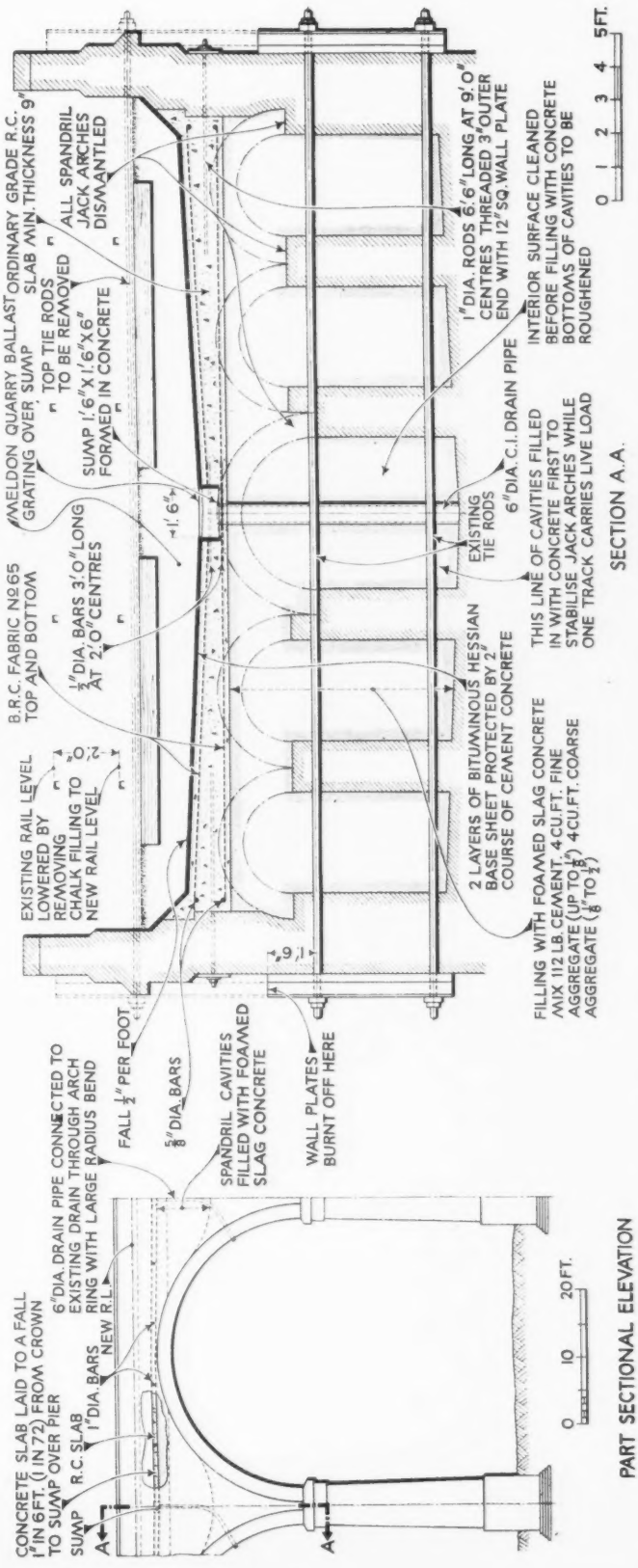
Total lightweight concrete required	...	800 cu. yd.
Total reinforced concrete in slab	...	360 cu. yd.

In addition to the above inward deliveries, some 3,000 cu. yd. of excavation is entailed in removing all the fill from the viaduct and regrading the approaches. A drag line excavator (½ yd. Insley) assisted by a D4 bulldozer on the ground, is disposing of the spoil by dumping it on the embankment slopes and on spare ground at the foot of the viaduct, to save rail hand ing from site. This excavator, of which only the jib is free to swing, is ideal for the site, as the cab of the usual type of excavator would foul the viaduct parapet when swinging.

Plant in addition to that on excavation work includes: two locomotive tenders for water supply, two 10/7 concrete mixers, two compressors, and two lighting sets.

The work is planned to be finished by Easter, 1951, and at the moment is up to schedule.

PAPER SHORTAGE IS SERIOUS.—Serious consequences of a paper shortage are foreshadowed in a letter sent by Mr. Harold Wilson, President of the Board of Trade, to all local authorities in support of a new salvage drive launched by the Waste Paper Recovery Association. Mr. Wilson says that the consumption of waste paper by mills has substantially outstripped collections and consequently stocks of waste paper have fallen to a low level. Unless collections can be increased, production of paper and packaging boards is bound to fall and supplies are already inadequate. Mr. S. T. Garland, General Manager of the Association, points out that practically every industry is dependent on waste paper and board and the shortage constitutes a grave threat to trade. It is estimated that 1,000,000 tons may be needed during 1951, to fulfil the packaging needs of defence, export trade, and the home market; 600,000 tons must be recovered from industry.


MELDON QUARRY BALLAST ORDINARY GRADE R.C. GRATING OVER SUMP SLAB MIN. THICKNESS 9"
TOP TIE RODS TO BE REMOVED
ALL SPANDRIL JACK ARCHES DISMANTLED
SUMP 1'6"X1'6"X6" FORMED IN CONCRETE
1"DIA. RODS 6'6" LONG AT 9'0" CENTRES THREADED 3" OUTER END WITH 12" SQ. WALL PLATE
INTERIOR SURFACE CLEANED BEFORE FILLING WITH CONCRETE BOTTOMS OF CAVITIES TO BE ROUGHENED
0 1 2 3 4 5FT.
B.R.C. FABRIC NO 65 TOP AND BOTTOM
1"DIA. BARS 3'0" LONG AT 2'0" CENTRES
1'6"
EXISTING TIE RODS
6"DIA. C.I. DRAIN PIPE
THIS LINE OF CAVITIES FILLED IN WITH CONCRETE FIRST TO STABILISE JACK ARCHES WHILE ONE TRACK CARRIES LIVE LOAD
SECTION A.A.
EXISTING RAIL LEVEL LOWERED BY REMOVING CHALK FILLING TO NEW RAIL LEVEL
2'0"
2 LAYERS OF BITUMINOUS HESSIAN BASE SHEET PROTECTED BY 2" COURSE OF CEMENT CONCRETE
FILLING WITH FOAMED SLAG CONCRETE MIX 112 LB. CEMENT, 4 CU. FT. FINE AGGREGATE (UP TO ⅜") 4 CU. FT. COARSE AGGREGATE (⅜ TO ½")
9'1"
FALL ½" PER FOOT
⅝" DIA. BARS
SPANDRIL CAVITIES FILLED WITH FOAMED SLAG CONCRETE
WALL PLATES BURNT OFF HERE
CONCRETE SLAB LAID TO A FALL 1" IN 6FT. (1 IN 72) FROM CROWN TO SUMP OVER PIER
6" DIA. DRAIN PIPE CONNECTED TO EXISTING DRAIN THROUGH ARCH RING WITH LARGE RADIUS BEND
R.C. SLAB
1" DIA. BARS
NEW R.L.
SUMP
A
A
0 10 20FT.
PART SECTIONAL ELEVATION

(Left) Part sectional elevation, and (right) cross-section of viaduct under repair

Signalling for Eastern Region Electrification—1

New work between London and Gidea Park includes important areas worked by relay interlocking and improvements to facilitate the running of accelerated services

THE large amount of work necessary in connection with the re-signalling of the line between London and Gidea Park made necessary by the introduction of electric traction, and the limited time available in which to carry it out, caused the work to be divided into three main sections, each placed in the hands of a different signalling firm.

The first section comprises the extensive terminal layout at Liverpool Street and the nearby junction at Bethnal Green, at the top of the awkward 1 in 70 bank which begins just after the long disused Bishopsgate station site and is a considerable obstacle to the working of the traffic. The new signalling on this section has been provided by the Siemens & General Electric Railway Signal Co. Ltd. and marks the first application of a route relay panel installation to a large terminus in this country.

As already explained in our issue of April 15, 1949, the installation of electric services between London and Shenfield required extensive re-arrangement of the lines at Liverpool Street, with the object of increasing the capacity of the various station tracks and bringing the whole of the local lines services over to the eastern side. These lines formerly were the centre tracks of the six which lead to Bethnal Green, the through lines being to the south of the local lines out to Shenfield.

Eliminating Confliction of Movements

To eliminate unnecessary confliction of movements at the terminus, the effects of which had already been felt under steam working, a fly-over was constructed at Ilford, as illustrated in our issue of November 28, 1947, by which the position of the local and through lines was transposed, the local lines on the London side of Ilford being on the south of the through lines. (Since the complete change-over following the introduction of the electric services the former local lines have been known as the electric lines and the former through lines as the main lines. The latter, however, are equipped to enable electric trains to run over them, as required.) At the same time, additional space was obtained on the eastern side beyond the station platforms at the terminus by setting back the retaining wall, thus enabling the tracks themselves to be modified, platforms to be lengthened, and additional connections to be put in. All these changes have greatly improved the facilities afforded. These improvements are reflected in the excellent train services now being operated, which have met with an immediate response from the public.

The signalling at Liverpool Street and the junction at Bethnal Green, in immediate association with it, represents the manufacturer's latest practice in route relay interlocking apparatus. The terminus itself was formerly controlled from two mechanical boxes containing 380 levers, with certain subsidiary " observation " boxes which did not work any points or signals, but kept watch over the state of the various platform lines, as an additional measure of security, and controlled the actions of the men working in the ordinary signal boxes. In addition, there were four intermediate boxes between the station yard and Bethnal Green, one of which worked the junction to the East London line.

These large station boxes, with the Sykes lock-and-block apparatus, in general use throughout the old G.E.R. suburban area, had been in service since the last principal changes were made to the station about 1895, and had been equipped by the then well-known firm of McKenzie & Holland, of Worcester. With certain modifications they had proved capable of handling the remarkably dense peak hours traffic, which became very heavy on certain routes after the improved accelerated steam services were inaugurated on July 12, 1920, but it was only a matter of time before they would have to give way to more modern equipment. No doubt, but for the two wars, such a change would have been made many years ago.

The new Liverpool Street signal box, with its adjoining relay room, is situated on the east of the lines next to the Worship Street bridge and the panel is divided into three separate sections. The centre section is 15 ft. long and shows the whole of the area controlled, which is convenient for the traffic regulator, who sits at a desk immediately facing it. This panel is fitted with the route keys for the main lines and associated indications. To the left is the panel, 12 ft. long, dealing only with the suburban lines, and to the right is the third panel, also 12 ft. long, which controls the working on the electric lines. These two shorter panels, of course, show lines also depicted on the centre panel.

The three panels are mounted end to end, forming a continuous board, and control a total of 318 routes. An interesting feature is that although certain platforms are common to electric and main, or suburban and main lines, the operators are, with one exception, free within the limits of safety, to use the platforms as they require, no co-operative action between panels being necessary. The exception is covered by a special release between the suburban and main panels. Starting signals from common platforms are controlled from the panel to which the particular route in question at the moment applies. One such signal may have keys on two panels, and when one of these is turned a warning indication becomes illuminated on the other panel, during which time the second key cannot be used to initiate a route.

The panels consist of a metal cabinet fixed to the floor, the upper track diagram and operating portion being inclined backwards at 15 deg. from the vertical. The finish is matt green; the tracks are depicted by variously coloured metal strips, enabling the different sections to be distinguished readily.

Route Setting

The route setting is accomplished by multi-position switches specially designed for this installation and capable of taking up any one of eight positions. If more than eight routes are involved two switches are provided. When a main and subsidiary signal are concerned the routes are regarded as separate; the main signal is operated by red switches (or switch positions) and the subsidiary by yellow switches (or switch positions). The panel carries switches at each signal location, whether running or shunt. The ground signals, which become facing to either incoming or outgoing movements, precede the innermost running signal. The route switches for such facing shunt signals are operated, setting the points concerned, and the operation of the last running signal switch completes the route and clears that signal provided all points are correctly set and detected and all facing shunt signals off. Of course, all track circuit sections concerned must be clear.

There is no locking of any kind on the route switches themselves, which are free to move at all times. It is necessary with this working to restore route switches promptly to normal to avoid holding up conflicting movements unnecessarily. For this reason most points are "non-restored," that is, they remain in the position they occupy when a route switch is returned to normal, but an exception is made in the case of certain siding and locomotive yard trap points, to give protection to running lines.

It is interesting to note that the track circuit indications are carried further out than would normally be the case, to the top of the Bethnal Green bank, so that the signalmen at Liverpool Street can watch the progress of down trains and, if they see sections occupied for undue time, caused possibly by a train being unable to ascend the bank, they can re-route other trains or hold them back sufficiently to avoid another train meeting with the same difficulty.

The track circuits within station

Four-aspect signal with junction indicator and telephone box

limits are single-rail a.c. condenser fed, but outside those limits, where there are no points and crossings, they are double-rail, with impedance bonds.

The relay room houses all relays and associated equipment operated from the panel for signal and point control and indication, as well as the track repeating relays; there are some 1,400 relays in all. It was necessary to have five runs of racking, each the length of the room, to give the required accommodation, the wiring being carried above each shelf. By means of boards under each wire trough, drilled to match the terminals, and setting the relays out in a standard sequence according to function, a neat layout has been obtained. The incoming multi-core cables, which have a maximum of 61 cores of conductors, varying between 1·044 in. and 7·064 in., used between the signal boxes and the track-side housings, are carried through the relay room to terminate on a terminal and fuse panel, 40 ft. long, 7 ft. high and holding 2,300 link-type terminals, and 200 fuses.

At Bethnal Green the equipment is similar but much less extensive. There were formerly two mechanical boxes at this point, which is the junction for the lines to Chingford, Palace Gates, Enfield, Tottenham, also Cambridge *via* Clapton and Tottenham, and the main route to Stratford and the eastern counties generally.

Except at the few places where clearances were very restricted and the searchlight type of signal had to be used, all running signals are of the multi-lens pattern, 2-, 3- or 4-aspect, as circumstances require, with side lights for close-up indications and also deflecting prisms moulded into the sectors of the outer lenses, and backlights for the red aspects. They function where necessary in conjunction either with roller blind type route indicators or position-light junction indicators, and have 12 volt double filament 25 watt lamps. In the station area, where length of light beam is of less importance than width, lenses giving a beam spread of 30 deg. are provided. There are 73 multi-aspect running signals working with 23 roller blind indicators and 17 junction indicators.

The ground and subsidiary signals are of the 2-position banner type operated through isolating transformers from a 110 volt a.c. supply, the white glass display screen being illuminated from inside the signal at night. The arms are proved in both the "on" and "off" positions. When route indicators are associated with shunt signals they are of stencil type divided into compartments for the various indications, each illuminated as required by a 60 watt lamp.

The points are operated by d.c. 110 volt machines, of which there are 146, generally of the combined type, comprising the motor drive mechanism, point locking device and switch tongue detector contacts, all in a single unit. Power for working these machines comes from a battery of Chloride pattern cells charged through transformer-rectifier sets. At Liverpool Street itself all points are operated by separate machines, but at Bethnal Green, with one exception, double-end points are operated by one machine with rodding to the far end.

In several instances where the point tongues are on bridge work or an obstruction exists a separate detector is fitted at the points and the machine is fixed in some cases midway between the ends, with rodding running in each direction. The layouts range from simple derailers and wide to gauge points to double-slips and points with angle crossing protectors.

There are 199 sets of equipment for single-rail track circuits, consisting of a 1/1 feed isolating transformer, a 20 μf adjustable condenser and double-element vane relay. Nineteen sets are installed for impedance bond track circuits, with similar isolating transformer and 6·3 μf adjustable condenser at the feed end, a 20 μf adjustable condenser and double-element vane relay, with auto-impedance bonds at each end of a section.

Power Supply

Power is obtained from the local supply mains at 400 volts, 3-phase, 50 cycles, and comes in at Bishopsgate power-house, where the transformers change it to a 2-phase supply, each phase being 660 volts. The loads are balanced by using one phase for the supply of all outside apparatus, including Bethnal Green box, and the other for Liverpool Street. Should this local supply fail, a stand-by set consisting of a 35 h.p. 6-cylinder petrol engine and

Interior of Liverpool Street relay room

3-phase alternator giving 33 kVA at 400 volts; is brought into operation automatically, and this will occur also should the outside voltage fall to more than 10 per cent. below normal or the frequency vary by more than 4 per cent. The normal change-over period is 7 to 8 seconds. For reconnecting to the local supply hand change-over is used.

The signalling supply is transmitted by twin core ring feeders east and west of the power house and all trackside locations are fed from them. Any one section of the ring main can be disconnected without affecting continuity of supply. With the ring intact maximum voltage drop does not exceed 10 per cent., and with a break in it 15 per cent. at most. The supply for Bethnal Green is also taken from this feeder, the main supply to Liverpool Street being taken from the second phase, although it is necessary at some locations to use the first to feed the locals of double-element relays. The second phase is stepped down to the a.c. working voltage of 110 and to 12 for supplying indicating lamps on the control panel. Transformer-rectifier sets provide 24 volts d.c. for the relay interlocking system and 110/150 volts for charging the secondary cells.

All cables were manufactured to the Railway Signalling Cables Specification 1, Clause 20f. About 500 core-miles are installed. A number of problems arose from the presence of obstructions above and below ground and train clearances. Where cables cross under the tracks asbestos-concrete ducts were laid to a depth of 2 ft. 6 in. and the cables were drawn through. At ground level they are laid in reinforced concrete troughing, but wherever possible the runs are arranged on metal brackets bolted to the walls and bridgework.

The wiring in the relay rooms and cabins had to be specially organised, as some six months only were available for wiring. To ensure quick and accurate work a typewritten schedule was prepared, in preference to working from diagrams. This showed (a) the function controlled by the wire; (b) where the near end of the wire was to be attached; and (c) where the far end terminated. Details covering the lengths of individual wires also were given in addition to the number of wires to be attached to the various terminals.

From these particulars 85,000 labels were prepared, and at the peak of the work 7,000 were required weekly. By means of a complete set of indicating instruments, switches, cable connectors and loud speaker equipment, it became possible to check fully all circuits and then to simulate operation of all outside apparatus which would finally be controlled from the panel. These arrangements reduced the time that otherwise would have been required by several weeks.

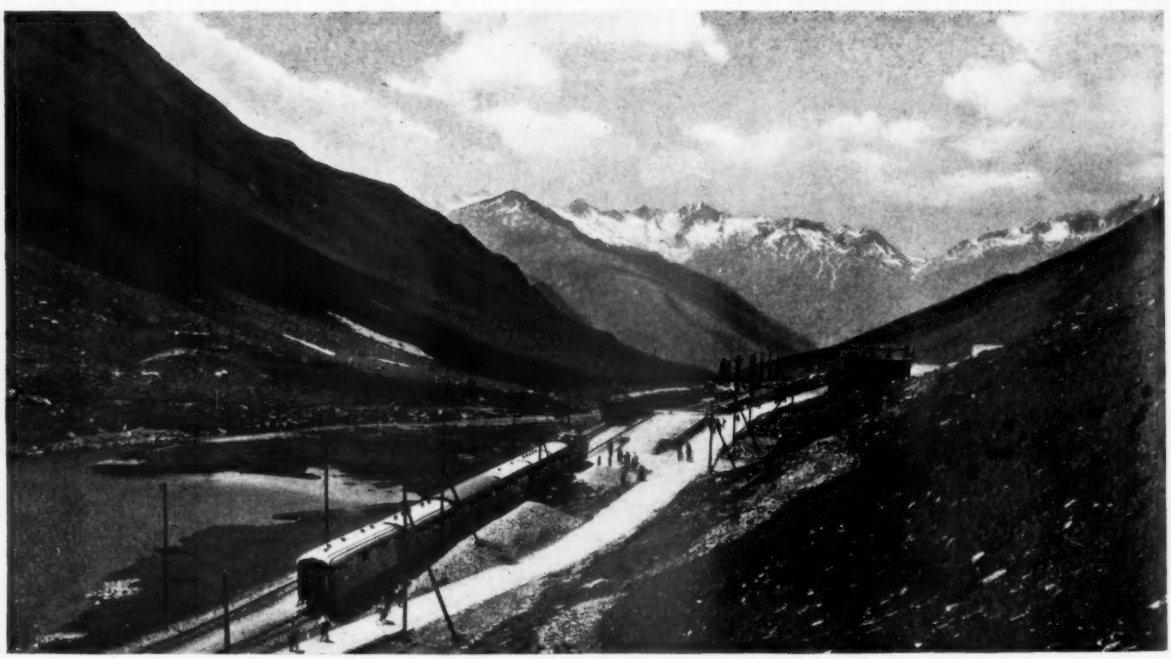
The test cabinet proved of great value during the training of the signalmen; and when the panels were brought into use no trouble in operating them was experienced. About 85 miles of single core flameproof wire was used.

Train Describers

With the new signalling permitting of a number of trains being between signal boxes at the same time it became necessary to provide train describers from Liverpool Street right through to Romford, and a comprehensive system is being manufactured comprising over 100 instruments to work between Liverpool Street and Romford, Bethnal Green and Hackney Downs, Bow Junction and Gas Factory Junction, Stratford and Channelsea Junction, Chobham Farm and the Southern Junction. Retransmitting instruments are being provided for intermediate boxes with terminal receivers and transmitters at each end of the area. Once initiated a description becomes sent forward automatically from box to box, and when a train is passed from one line to another its complete description is switched over to the appropriate instrument.

This apparatus will be the largest and most comprehensive of its kind in the world. Apparatus of magazine type has been installed temporarily.

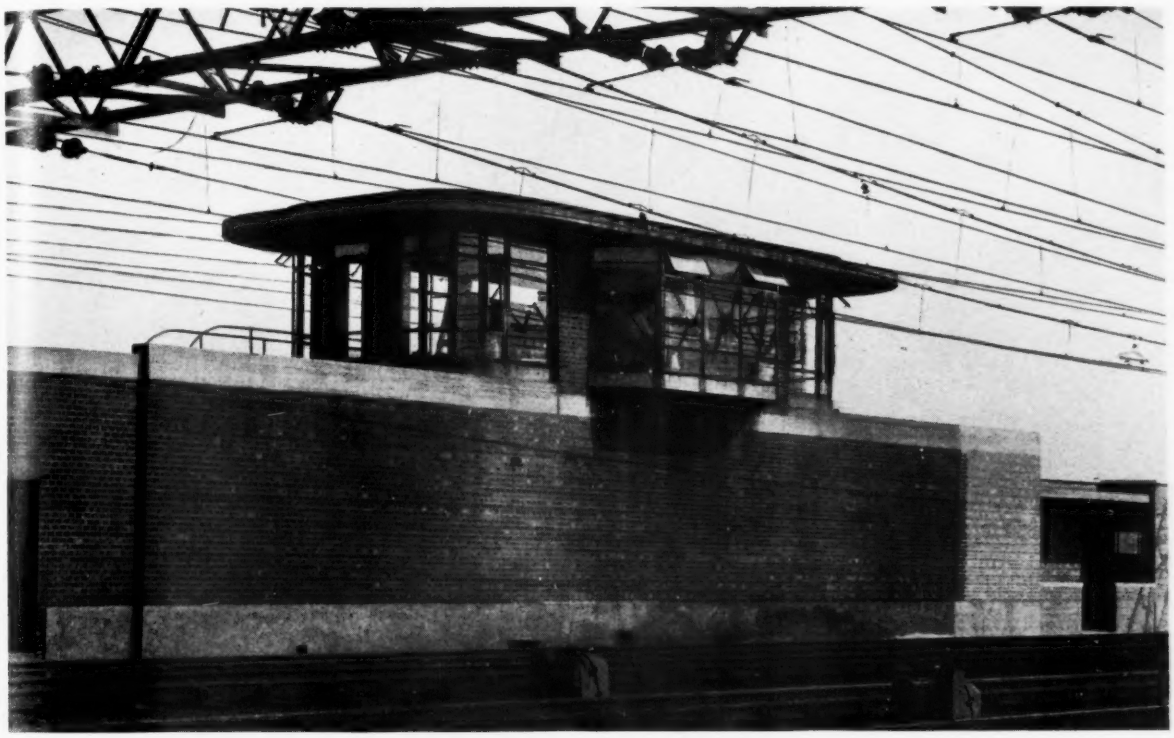
Near the Summit of the Furka-Oberalp Railway



East- and westbound "Glacier Expresses" of the Furka-Oberalp Railway crossing at Oberalpsee, near the summit of the line, 6,640 ft. above sea level

Photo] [J. Haemisegger

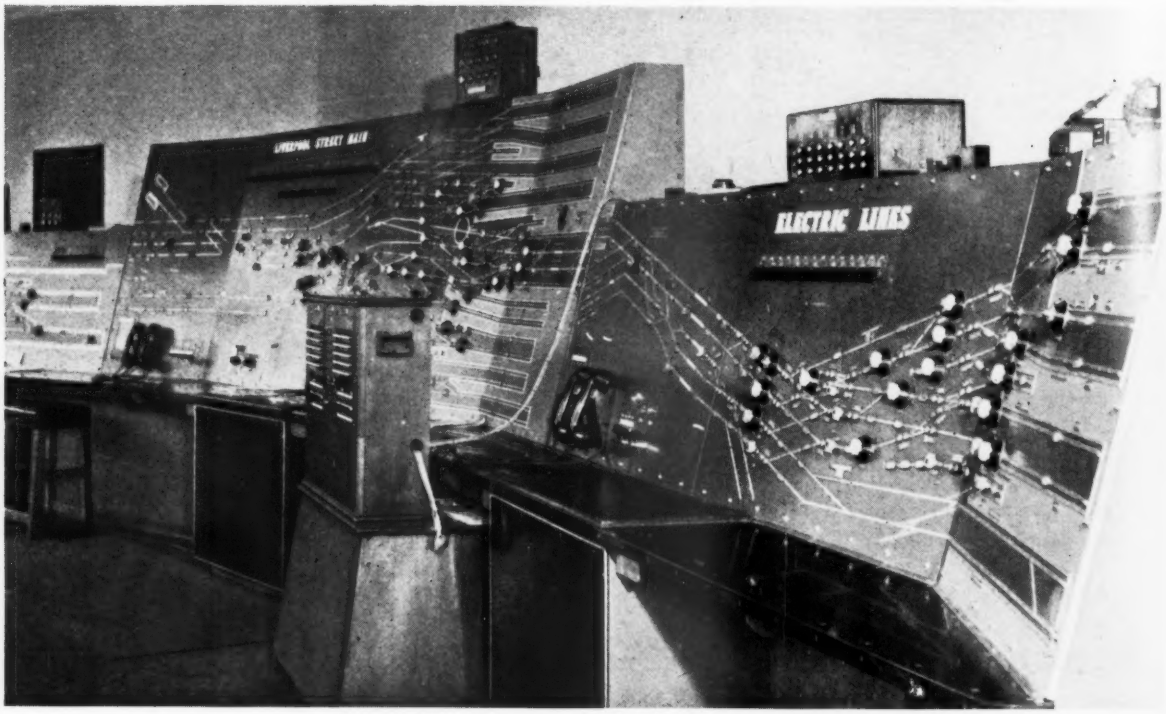
Signalling for Eastern Region Electrification—1



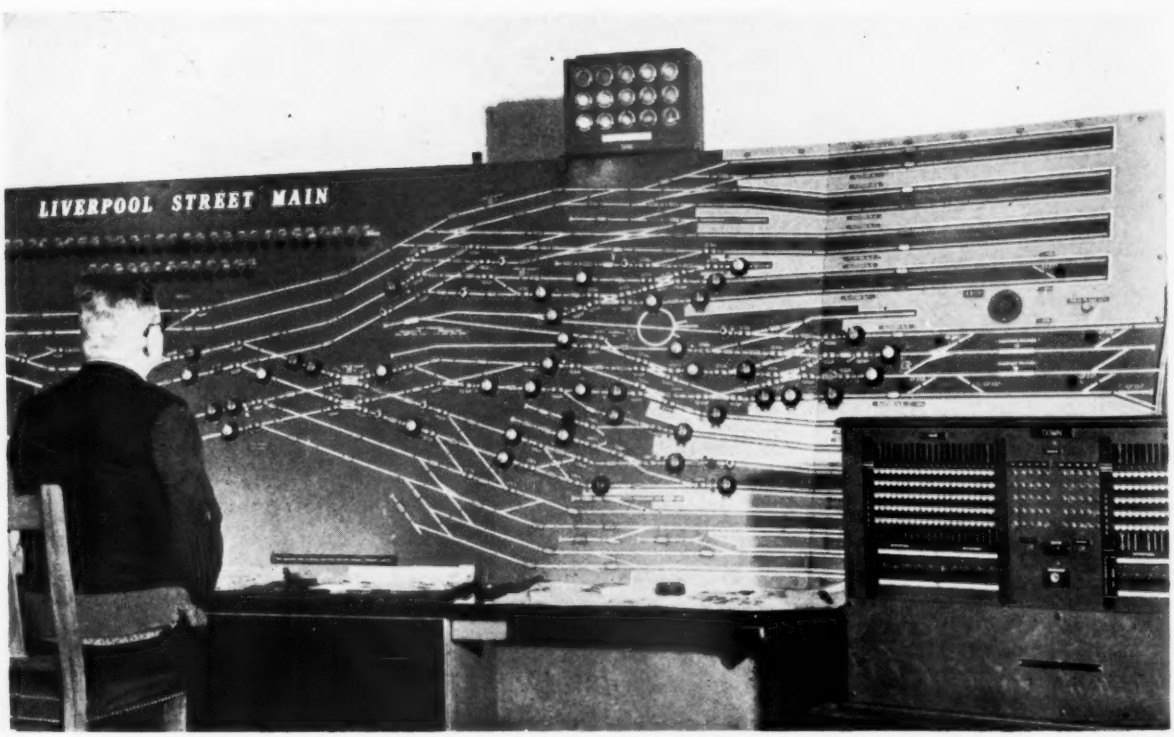
Exterior of Bethnal Green new signal box

Relay interlocking panel and telephone switchboard at Bethnal Green

Signalling for Eastern Region Electrification—1



Part of suburban panel, with main and electric lines panels, Liverpool Street



Near view of main lines panel, on which all track circuits are indicated

Repairs to Hurstbourne Viaduct, Southern Region

(see article on page 542)

Excavation of chalk filling from up road

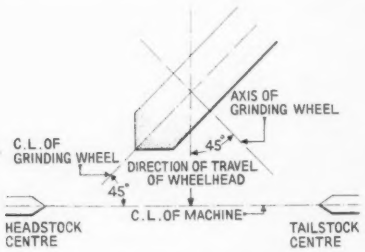
Regraded up road, showing, in left foreground, beginning of new reinforced concrete slab

Filling and ballast of single line on viaduct retained by sandbag wall

Angular Head Precision Grinder

Operation is carried out with the periphery of the wheel

A PRECISION grinding machine having an angular head has recently been developed by the Newall Engineering Co. Ltd., Peterborough, in which the wheelhead spindle is at 45 deg. to the movement of the wheelhead slides. The

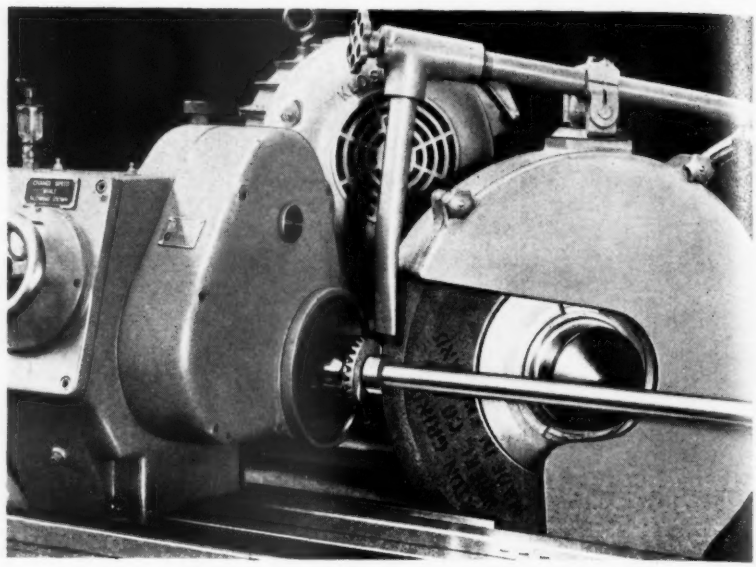


Relation of grinding wheel to centre line of machine

travel of the wheelhead is 90 deg. to the machine centre and this is standard practice.

Grinding is accomplished with the periphery of the grinding wheel and imparts a finish to the diameter and face of a component without producing radial grinding marks usual when the operation is performed by a lip formed on the side of edge of the wheel.

The basic design has been taken from the Newall "L" type machine, having an improved hydraulic control box assembly, and it is manufactured with a capacity of 10 in. by 36 in. A range of six work speeds is given by the geared work head and are 18, 30, 52, 90, 155, and 265 r.p.m. The hydraulically controlled table speeds are infinitely variable from 3 in. to 240 in. a min. The wheelhead has a rapid traverse of 2 in. and the continuous infeed plunge cut is infinitely adjustable. Four electric motors, 400/440 V. a.c., three-phase, are fitted, with output as follows:—wheelhead motor, 7½ h.p.; workhead motor, 2 h.p.; hydraulic pump motor, 2 h.p.; coolant pump motor, ¼ h.p.



Wheel in position for grinding the face and dia. of a pinion shaft

An Indian Railway Administrative Building

Headquarters of the Madras & Southern Mahratta State Railway, Park Town, Madras

RAILWAY NEWS SECTION

PERSONAL

Messrs. James Muir, R. J. Dinning, and H. E. Sellers, have been appointed additional directors of the Canadian Pacific Railway Company.

Lt.-Colonel Harold Rudgard, O.B.E., M.I.Mech.E., M.I.Loco.E., M.Inst.T., Chief Officer (Motive Power), Railway Executive, who, as recorded in our issue of December 8, has retired, entered the service of the Midland Railway in 1900 as a pupil under Mr. S. W. Johnson. After going through the various workshops, he obtained six months' firing experience before entering the drawing office, and later was appointed District Locomotive Superintendent at Skipton, at Derby, and at Plaistow (London, Tilbury and Southend Section), successively. He was called up in the Territorial Army in 1914 and served for 20 months in the trenches; later he was attached to the Royal Engineers, Light Railway Section, as Superintendent of the Light Railways, 4th Army, afterwards commanding the Light Railway Workshops, Beaurianville, B.E.F., and Carriage and Wagon Depot, Audruicq, B.E.F. He retired from the army in 1919 with the rank of Lt.-Colonel; in 1925 he was gazetted Lt.-Colonel, Land Forces, and was called up on mobilisation in 1939, but authority was obtained for his retention in the railway service. He was gazetted Major in the Royal Engineers (Engineer and Railway Staff Corps) on February 1, 1944 and Lt.-Colonel on February 26, 1949. During his service in France and Belgium he was wounded twice, and on two occasions was mentioned in despatches. In 1919 he was appointed Assistant Superintendent of Freight Trains, M.R., Derby, and, on the grouping, he was made Assistant to the Motive Power Superintendent, L.M.S.R., Derby. In 1932 he became Divisional Superintendent of Motive Power (Midland Division), Derby, and he was appointed Assistant Divisional Superintendent of Operation, Derby, in 1935; he became Divisional Superintendent of Operation there in 1937. Under Colonel Rudgard's leadership the Midland Division won the Express Passenger Train competition for 1938, which carried with it the Byrom Cup; also the 1938 Divisional Freight Train Competition. He was appointed Superintendent of Motive Power in December, 1942, and he became Chief Officer (Motive Power) Railway Executive, in 1948. In our own issue of August 8, 1947, we reviewed a publication, "Motive Power Organisation and Practice," which he had prepared for the L.M.S.R. Lt.-Colonel Rudgard was President of the Institution of Locomotive Engineers for 1948-49.

Lt.-Colonel Harold Rudgard
Chief Officer (Motive Power) to the Railway Executive, 1948–50

Mr. R. F. Harvey
Appointed Chief Officer (Motive Power) to the Railway Executive

Mr. R. F. Harvey, M.B.E., M.I.Mech.E., M.I.Loco.E., Motive Power Superintendent, Scottish Region, who, as recorded in our issue of December 8, has been appointed Chief Officer (Motive Power) to the Railway Executive, was born at Louth and began his service with the former Midland Railway in October, 1908, as a pupil in that company's locomotive works; at this time he received technical training at the Derby Technical College. After passing through the various shops Mr. Harvey had experience in the running sheds, including firing, and was transferred to Leeds as Assistant to the District Locomotive Superintendent in November, 1914, and to Kentish Town in a similar position in May, 1915. Later in the same year he joined the Royal Navy and served with the Grand Fleet as an electrical engineer until January, 1919, when he returned to Kentish Town as Assistant District Locomotive Superintendent. In January, 1922, Mr. Harvey was transferred to the District Control Office, Kentish Town, for further experience, followed in April of the same year by experience of the Head Office Control at Derby in both freight and passenger services. Mr. Harvey was appointed District Locomotive Superintendent, Worcester, in October, 1922, and was transferred to a similar position at Burton-on-Trent in July, 1923, taking over the North Stafford and L.N.W.R. sheds in addition to the Midland. In April, 1927, he was transferred to Rugby as District Locomotive Superintendent, and also took over the Chief Mechanical Engineer's repair shops at that depot. Mr. Harvey was moved to Edge Hill in a similar capacity in March, 1932, and to Manchester as Assistant Divisional Superintendent of Motive Power in January, 1934. In October of that year he was appointed Assistant to the Superin-

Mr. A. J. Robinson

Appointed District Operating Superintendent, Exeter, Western Region

Mr. Frank Batty

Appointed Freight Trains Assistant to the Operating Superintendent at Glasgow, Scottish Region

Mr. H. J. Williams

Works Manager, Carriage & Wagon Department, Gorton, Eastern Region

tendent of Motive Power, Euston. In 1939, Mr. Harvey was appointed Assistant Operating Manager for Scotland, L.M.S.R., and in January, 1948, Motive Power Superintendent, Scottish Region. In 1924, on the formation of the Supplementary Reserve, Royal Engineers (Transportation) Mr. Harvey raised one of the Workshop Companies and commanded it with the rank of Captain until he was transferred to the Regular Army Reserve of Officers. He was awarded the M.B.E. in January, 1943, for services rendered during the war.

Mr. A. J. Robinson, who has been appointed Western Region District Operating Superintendent at Exeter, was educated at Marlborough College, joined the then Great Western Railway in 1911, and served in the London area until 1925. During his war service in 1915-18, he was twice wounded and mentioned in Despatches. Transferred to Plymouth in 1925 as Traffic Assistant for the G.W.R. omnibus services in the West of England, he remained there until 1929 when he was appointed Area Traffic Superintendent, Western National Omnibus Company, Truro. Appointed to the Road Transport Department at Paddington in 1934, Mr. Robinson served in various Headquarter departments until his appointment in 1942 as Assistant Divisional Superintendent, Cardiff.

Mr. Frank Batty, Head of the Divisional Operating Superintendent's & Commercial Superintendent's Freight Trains Section, York, North Eastern Region, who has been appointed Freight Trains Assistant to the Operating Superintendent at Glasgow, Scottish Region, joined the North Eastern Railway in 1915 and occupied various posts in the Darlington and Middlesbrough Operating Districts until appointed District Inspector at Burntisland, L.N.E.R., in January, 1935. He was appointed Deputy Chief Controller in the Darlington District Superintendent's Office in 1937, and Chief Trains Clerk & Controller in May, 1938. In 1940, he was one of the first Deputy Chief Controllers to be appointed for the Central Control in the Superintendent's Office at York and was promoted to Senior Freight Trains Clerk in that department in 1941. In January, 1943, Mr. Batty was appointed Assistant to the District Operating Superintendent at York; in February, 1946, he was promoted to be Head of Freight Trains Section, York.

Mr. H. J. Williams, Works Manager, Carriage & Wagon Department, Eastern Region, Gorton, who retired on November 4, 1950, joined the Great Eastern Rail-

Mr. A. Udell

Appointed District Motive Power Superintendent, Hull, North Eastern Region

Mr. W. K. Hamilton

Appointed District Motive Power Superintendent, Perth, Scottish Region

Mr. J. W. Lamond

Appointed District Motive Power Superintendent, Burntisland, Scottish Region

way in the Mechanical Engineer's Department at Stratford in 1907. He served in the armed forces in 1915-18, and was appointed Railway Clearing House Inspector of Materials at Sheffield in 1920, and in 1938 was promoted to the position of Chief Materials Inspector at Doncaster, L.N.E.R. He was appointed Locomotive Works Manager at Gorton in 1941 and in 1943 to the position he now vacates.

Mr. Edward Holland-Martin has been appointed a Director of the British Aluminium Co. Ltd.

Mr. F. J. Oliver has retired from the board of the Costa Rica Railway Co. Ltd., and Mr. T. C. B. Williams, formerly Secretary, has been appointed Managing Director. Mr. A. J. Hobson has been appointed Secretary to the company.

Mr. A. Udell, former District Motive Power Superintendent, Blackpool, London Midland Region, who was appointed District Motive Power Superintendent, Hull, on October 24, 1950, was educated at Huddersfield Technical College and joined the London & North Western Railway as an apprentice fitter in 1906, and occupied various positions until his appointment as Running Shed Foreman, Goole, in 1937. He acted as Assistant to the Divisional Motive Power Superintendent, Manchester, from 1941 until appointed Assistant District Locomotive Superintendent, Accrington, in 1944, and in 1946, District Locomotive Superintendent, Blackpool.

Mr. W. K. Hamilton, Assistant (Utilisation) to the Motive Power Superintendent, Scottish Region, who has been appointed District Motive Power Superintendent, Perth, was educated at Perth Academy and Dundee Technical College. He joined the Caledonian Railway Company in 1917, completed his apprenticeship as a locomotive fitter and occupied a number of positions until appointed Assistant District Locomotive Superintendent at Perth, L.M.S.R., in 1938, and, next year, Locomotive Foreman at Greenock. In 1942 he was promoted as Assistant Locomotive Superintendent at Carlisle and in May, 1946, was appointed Assistant (Locomotive Utilisation), to the Operating Superintendent, Glasgow. In January, 1949, Mr. Hamilton was promoted Assistant District Motive Power Superintendent at Polmadie, Glasgow, and towards the end of that year was appointed Assistant (Utilisation) to the Motive Power Superintendent, Scottish Region.

Mr. J. W. Lamond, District Motive Power Superintendent, Carlisle (Kingmoor), who has been appointed District Motive Power Superintendent, Burntisland, joined the then Caledonian Railway in May, 1908, as an apprentice fitter. In 1936 he was promoted Maintenance Assistant (Locomotives) to the Operating Superintendent, L.M.S.R., Glasgow. In 1945, Mr. Lamond was appointed District Locomotive Superintendent at Motherwell, and in 1949 was transferred to Carlisle.

Lt.-Colonel S. J. L. Hardie, who, as recorded in our November 24 issue, has resigned his appointment as a part-time Member of the British Transport Commission, following his appointment as Chairman of the Iron & Steel Corporation, has also resigned from the boards of a number of companies. Among the appointments he has relinquished are those of Chairman of the British Oxygen Co. Ltd., the Ferro-Arc Welding Co. Ltd., and the Quasi-Arc Co. Ltd.; Vice-Chairman of Metal Industries Limited; and Director of Fullerton, Hodgart & Barclay Limited, Glenfield & Kennedy Limited, and Igranic Electric Co. Ltd. A portrait and biography of Lt.-Colonel Hardie appeared in our August 4 issue.

Mr. W. S. Steel has been elected a Director of the British Thomson-Houston Co. Ltd.

We regret to record the death on December 2, at the age of 70, of Mr. Percy Goad, Director of the British Standards Institution.

Mr. Walter Davies has been appointed Assistant European Accountant to the Canadian Pacific Railway.

We regret to record the death on December 4 of Mr. Fred Kenworthy, Governing Director of James Kenworthy & Son Ltd.

Mr. B. O. Tillström, previously Assistant London Manager, Swedish State Railways, has been appointed London Manager, in succession to Mr. K. E. A. Svenrik.

Mr. K. R. M. Cameron, District Motive Power Superintendent, Gorton, Eastern Region, has been appointed District Motive Power Superintendent, Kings Cross, in succession to Mr. J. A. Frampton, who has retired.

The board of Powell Duffryn Technical Services Limited announces that Mr. A. L. G. Davies and Dr. A. A. J. K. Eskreiss have been appointed Directors of the company; it is also announced that Mr. J. G. Bennett has resigned from the board.

Mr. D. Lacy-Hulbert has been appointed Joint Managing Director (Technical) of Tube Investment Limited subsidiary, Chesterfield Tube Co. Ltd. He was formerly Director of Production of the Steel Tube Division of Tube Investments Limited, and joined Chesterfield Tube Co. Ltd. last year.

Consequent on the appointment of Jack Olding & Co. Ltd. as sole World distributors of the Vickers Industrial Tractor, arrangements have been made under which Vickers Limited appoint two directors to the board of Jack Olding & Co. Ltd.; the first appointees are Mr. J. Reid Young and Major-General C. A. L. Dunphie.

The following notification appeared recently in *The London Gazette* under the heading of Regular Army Reserve of Officers, Royal Engineers:—

Captain G. W. Davies, O.B.E., from Supplementary Reserve of Officers, to be Major, September 20, 1950, with seniority November 1, 1947, and is granted the honorary rank of Colonel.

Mr. R. Speirs has been appointed Manager for London and Southern England of Dorman & Smith Limited, and will also represent the interests of the associated companies D.S. Plugs Limited, Alorite Limited, and British Klockner Switchgear Limited. Until recently he was Manager of the Plant Division of Crompton Parkinson Limited in Manchester and North West England.

We regret to record the death on December 1 of Mr. E. A. Haynes, Head of the Freight Train Section, Operating Superintendent's Office, Paddington, Western Region. Mr. Haynes joined the G.W.R. in 1892 and was transferred to the Divisional Superintendent's Office, Paddington, in 1897, and in 1911 to the office of the Superintendent of the Line, Paddington. In 1929 he was appointed Head of the Goods Train Running Section of the Superintendent of the Line's Office, where he remained until his retirement in 1938. Mr. Haynes was re-employed in 1941-45, again in the Office of the Superintendent of the Line.

Sir Edward Cripps and Sir William Christie have been appointed Directors of Thomas Tilling Limited.

Mr. H. B. Mackenzie, formerly Sales Secretary, India Tyre & Rubber Co. Ltd., has been appointed Assistant Sales Manager.

We regret to record the death on December 10 at the age of 63 of Mr. J. W. Bayley, Chairman & Managing Director of the Ellerman Lines Group, Chairman of Ellerman's Wilson Line Limited, and a Director of Wilsons & North Eastern Railway Shipping Co. Ltd.

Mr. A. J. Kirk has joined the staff of the Industrial Department, Philips Electrical Limited; he had previously been Commercial Manager, Petbow Limited.

Mr. R. F. Dyer, former Assistant in the Railway, Docks & Inland Waterways and Hotels Allocation Section of the Commercial Advertisement Division of the British Transport Commission, has been appointed Head of the Sales Section in that Division.

Mr. C. H. Sparks, Chief Engineer of Babcock & Wilcox Limited, is retiring from that position at the end of the year, but will continue as a Director and will also serve in a consulting capacity. Mr. W. F. C. Schaap, at present Deputy Chief Engineer, will be appointed Chief Engineer as from January 1.

Mr. P. J. Ferguson has relinquished his appointment as Scottish Branch Manager, the British Aluminium Co. Ltd., to take up a new appointment in the Head Office of the company in London as Export Sales Manager; he will assume his new responsibility from January 1. Mr. M. J. J. Richards, of the company's Midland Branch Office, has been appointed Scottish Branch Manager and took over this responsibility on December 1.

Mr. R. B. W. Bolland, who has vacated the post of Assistant District Passenger Superintendent, Newcastle, North Eastern Region, British Railways, to become Commercial Manager, Head, Wrightson Aluminium Limited, Thornaby, was educated at Bradfield College and joined the L.N.E.R. in 1933. He became a traffic apprentice in 1935, and was appointed Assistant to the District Passenger Manager, York, in 1938. He was British Railways representative at New York World Fair in America in 1939 and was attached to Movements & Transportation Branch of the Royal Engineers during the last war; he was invalided out of the Army with the rank of Major in 1944. On his return to the L.N.E.R. Mr. Bolland joined the staff of the Chief General Manager and in 1945 he was appointed Head of Development Section, Passenger Manager's Office, Liverpool Street. He was appointed Assistant District Passenger Superintendent, Newcastle, in 1947.

Railway Smoke Abatement

Papers read at the Margate conference of the National Smoke Abatement Society

The seventeenth annual conference of the National Smoke Abatement Society, which was held during September 27-29 at Margate, also marked the twenty-first anniversary of the Society.

Two papers were presented under the common title of "The Problem of Railway Smoke." The first, headed "A Statement of the Problem," was by Mr. W. O. Skeat, M.I.Loco.E., and the companion paper, entitled "The Attack on the Problem" was by Mr. M. G. Bennett, F.Inst.F., and constituted a reply, on behalf of the Railway Executive, to the former paper. The Chairman at the meeting was Sir Ernest Smith, C.B.E., Hon. Treasurer of the Society.

Before the papers were presented, the Chairman read the following message, from the Chairman of the Railway Executive, Sir Eustace Missenden:—

"Anything that can be done by coal users, whether industrial or domestic, to reduce smoke is a valuable contribution to the nation, both from the point of view of the avoidance of waste and as an aid to cleanliness and health. Problems that have been with us for so long often tend to be ignored or dismissed as insoluble; but this is a council of despair, and therefore I greatly welcome the work of your Society and of its conferences in keeping the matter so constantly before us all."

Mr. Skeat outlined the history of the normal firebox for the ordinary coal-burning locomotive, and mentioned that for some 30 years (roughly from 1830 to 1860) locomotive engineers had been obliged to use coke, and had striven to find some means by which coal could be burnt without the creation of a smoke nuisance. The solution had been arrived at by the adoption of a brick arch, abutting on to the firebox tube plate, in conjunction with a deflector plate placed inside the firedoor. This divided the firebox into two portions: the lower part, incorporating the firebars and the fuel on them, formed the furnace; and the upper part was the combustion chamber.

It was possible, given a reasonably well-skilled fireman and suitable fuel, to fire a locomotive with this kind of firebox, without producing any undue amount of smoke. Generally it was necessary to aim at the maintenance of a fairly thin white-hot fire, and to add small quantities of coal at frequent intervals. This demanded skilled attention, and would fail with bad coal or with lack of discipline on the part of the fireman.

The production of black smoke was far less of a nuisance in the case of trains on the move than when it was created by engines standing in stations, or working in shunting yards near dwelling-houses, or in tunnels. Mr. Skeat discussed each of these items in turn, but devoted the greater part of his paper to the production of smoke in running sheds, which he regarded as the "hard core" of the problem.

The emission of black smoke was most noticeable in locomotives in which the fires had been just lit and was particularly objectionable in locomotives which had been lit up "from cold" after being stopped for a few days for repairs. The aim should be to keep engines in steam, or at least to prevent them from cooling, for the longest possible periods. By the introduction of special methods of water treatment such as the French "T.I.A" process, the formation of scale could be minimised and the periods between boiler washings could be increased very greatly. Again, the need for frequent tube-sweeping could be much reduced by the introduction of some proprietary make of smoke eliminator.

Lighting-up methods came in for detailed attention, and mention was made of the gradual substitution of firelighters for lighting-up with live coals. The Americans used a sort of extraction fan placed in the chimney of the engine to be put in steam, so as to draw up the fire. Experiments with some device on the "gas poker" principle were suggested. Another American device was a large oil-burning torch of the Primus type which was placed in the firebox to ignite the fuel.

Direct Steaming

Far above these inventions in its relative importance, however, was the principle of direct steaming, in which steam was taken from a pipeline in the running shed and led directly into the boiler of an engine to be put into steam, before lighting up. Mr. Skeat urged the introduction of this method wherever possible.

Mr. M. G. Bennett emphasized the waste of coal involved when black smoke is emitted. He went on to enumerate points of locomotive design which had received special attention in the drive to obtain high boiler efficiency. The design of dampers, brick arches, and firedoors had been the subject of much study, and the provision of an efficient "front end" was a further factor. He also mentioned the fairly recent fitting of screens in the smokebox, to equalise the blast suction over the face of the front tube plate and thus reduce the amount of unburnt fuel lifted off the firebed.

He sounded a note of warning on the rate at which it was desirable to raise pressure in a locomotive after lighting-up and stated that it took some five hours (starting from cold) to generate enough pressure to work the blower. To avoid temperature strains, it was not desirable to accelerate this phase of steam raising. Nevertheless, he outlined the procedure known as "direct steaming" and said that this method was being actively developed, and that some locomotives were being fitted with cocks to permit direct steaming, should it be adopted as a general policy.

Perhaps the most important section of this paper, however, was that dealing with the training of recruits into the locomotive running departments. By the help of mutual improvement classes and as a result of the "follow-up" activities of a team of about 100 inspectors, which included practical instruction on the footplate, young men were given a thorough training. Three instructional trains, with cinema and demonstration car, also covered the country.

Looking ahead, the limitation on capital expenditure affected alike such schemes as the installation of direct steaming equipment and the large-scale adoption of motive power other than steam locomotives. Even if electric traction, or some other form of motive power, were widely adopted, it was not to be supposed that it would necessarily result in less atmospheric pollution over the country as a whole.

Mr. Wilkinson, Stewarts and Lloyds Limited, thought that there was a good case in steelworks for the use of oil-fired shunting locomotives, as he considered that better control over combustion would be obtained thereby. The rule of firing "little and often" was frequently impossible to apply here.

Mr. S. H. Richards, Fuel Research Station, Greenwich, remarked how appalled he and some colleagues had been at the smoke they had seen when visiting Stratford running sheds, and made some interesting comparisons with the emission of smoke from river tugs on the Thames.

Mr. Law, of Sheffield, looked forward to the future use of locomotives with higher efficiencies.

Mr. Cash, Yorkshire Power Company, suggested that automatic combustion control, as adopted in power stations, might be adapted to locomotive use.

Mr. T. Henry Turner drew attention to the possibilities of fireless locomotives for steelworks, where enginemen were used to steam operation, and where is was not desirable to incur the expense of purchasing diesel locomotives.

The British Railways Instructional Train was on view, during the time of the conference, at Margate Station, and films on locomotive firing were shown to delegates.

BRITISH ELECTRIC TRACTION ACQUIRES SOUTH WALES BUS CONCERN.—The whole of the share capital of J. James & Sons Ltd., Ammanford, operators of bus services in Carmarthen, Glamorgan, and Cardigan, has been acquired by the British Electric Traction Co. Ltd. The former directors have retired from the board, and have been replaced by B.E.T. representatives. Mr. W. T. James, a director of B.E.T., is the new Chairman. For the time being, the company will continue under the name of J. James & Sons Ltd., and Mr. Angus James, one of the former directors, remains as General Manager.

INTERNATIONAL CHAMBER OF COMMERCE.—The views of transport users are to be submitted to Governments by the International Chamber of Commerce at the next Revision Conference of the Berne Conventions (1951), which regulate international railway traffic (C.I.M. & C.I.V.). The I.C.C. Commission on Railway Transport recently met in Paris, and approved draft regulations on privately-owned wagons, including a provision that railways must pay rent for use of such wagons. The meeting heard the preliminary results of an inquiry into the introduction of negotiable waybills. Currency difficulties in paying transport charges were also discussed. The Commission recommended that the freedom to pay transport charges at either end should be maintained where it existed and reintroduced where it had been abolished.

OVERSEAS TOURISTS IN THE OFF-SEASON INCREASE.—Statistics for October, issued by the British Travel & Holidays Association show that the campaign to attract more visitors from overseas during the off-season is succeeding. The total of foreign visitors during the month was 33,591 or 27·5 per cent. more than the pre-war average for October and 5·9 per cent. more than for the same month last year. It is estimated that in addition there were 7,500 visitors from the Commonwealth and Empire who make a total for the month of 41,091. Visitors from the U.S.A. numbered 7,494, which is 4·6 per cent. more than in October, 1949, and there were also 3,210 American citizens who remained in the country for short periods en route to other destinations. Tourist arrivals for the ten months January to October, 1950, are now estimated at 549,943.

Trial Run of Diesel-Electric Train for Egyptian State Railways

The first of 19 five-coach articulated trains built for service in Egypt by The English Electric Co. Ltd. was on trial last weekend

A trial run of the first of 19 diesel-electric five-coach articulated trains, the order for which was placed with the English Electric Export & Trading Co. Ltd. by the Egyptian State Railways, was held on December 10. The train made a journey from Birmingham, Snow Hill to Droitwich, and return, during which a speed exceeding 76 m.p.h. was reached. The new stock which has been designed for a service speed of 75 m.p.h. will operate between Cairo and Alexandria, a distance of 130 miles, and will cover the journey, including intermediate stops, in 2 hr. 10 min.; the stock will probably operate as far as Luxor later.

The diesel engines, electrical transmission, and controls were supplied by The English Electric Co. Ltd. at its Preston and Bradford works, and the coachwork and bogies were designed and built by the Birmingham Railway Carriage & Wagon Co. Ltd. as sub-contractors to The English Electric Co. Ltd. The train, which has an overall length of 255 ft. 3 in., provides for a total of 172 passengers, 60 first class and 112 second class, the first class compartment is air-conditioned. The weight of the train loaded is 152 tons. There is a buffet in the centre coach. The trains are being built under the supervision and inspection of the Egyptian State Railways Administration, Cairo, and the Chief Inspecting Engineer of the Egyptian Government in London. In addition to the five-coach trains, The English Electric Co. Ltd. has under erection for the Egyptian State Railways 11 three-coach trains which will be used on suburban services.

The guests who accompanied the train on its trial run included:—

Dr. Salah El Din Bey, Egyptian Minister of Foreign Affairs; Abdel Fattah Amr Pasha, Egyptian Ambassador; Messrs. A. Mansour, Minister, Royal Egyptian Embassy; A. M. Rizk, Chief Inspecting Engineer, Egyptian Government; Colonel M. Shafei, Royal Egyptian Embassy; Major M. Sebai, Royal Egyptian Embassy; Sir Ralph Stevenson, British Ambassador in Cairo; Messrs. N. B. Ablett, Chief Inspectorate, Egyptian Government; P. Aspinall, Chloride Electrical Storage Company; H. H. C. Barton, Messrs. Merz & McLellan; Major E. E. von Bibra, Agent-General for Tasmania; Messrs. A. Campbell, Chief Mechanical Engineer, Crown Agents for the Colonies; S. G. Carter, Acting Agent-General for Victoria; A. C. Chapman, Chief Inspectorate, Egyptian Government; A. H. Chilton, Chief Engineer, J. Stone & Co. Ltd.; G. H. Coxon, Anglo-Iranian Oil Company.

Messrs. F. O. Ellis, Great Western of Brazil Railway Company; J. A. Ferguson, Messrs. Sir Bruce White, Wolfe Barry & Partners; Colonel R. W. Foxlee, Engineer-in-Chief, Crown Agents for the Colonies; Messrs. G. Goddard, Messrs. Sandberg; A. Henderson, Messrs. Livesey & Henderson; W. Hopkinson, Acting Agent General for Western Australia; J. D. Lewis, Messrs. Fox & Mayo; M. McAully, Agent General for Queensland; C. R. Mayo, Messrs. Fox & Mayo; S. M. Nazir, Commercial Secretary to High Commissioner for Pakistan; C. T. Payn, Messrs. Sir Bruce White, Wolfe Barry & Partners; K. B. Rao, Director-General, India Store Department; G. S. J. Read, New Zealand Railways; H. V. Schofield, Director, D. P. Battery Company; A. M. Stewart, Inspecting Engineer, South Australian Government Railways; J. S. Tritton, Messrs. Rendel Palmer & Tritton.

The English Electric Co. Ltd. was represented by: Messrs. H. S. Aspinall, A. Sheffield, L. H. Short, and A. V. Wilkin, Directors, The English Electric Export & Trading Co. Ltd.; J. W. Baker, Head, Traction Erection, Preston; A. Barraclough, Representative in New York; K. Beaglehole, Deputy Manager, Traction Department, Bradford; D. Betts, Manager, Middle East; C. Brooksbank, Traction Liaison Production Officer, Preston; C. R. Dawson, Manager, Sales & Contracts Diesel Engines; L. I. Hadlow, Assistant General Manager, Diesel Engines, Rugby; J. F. Herbert, Manager in Malaya and Far East; W. G. Jowett, Chief Engineer, Traction Department, Bradford; S. C. Lyon, Chief Designer, Rolling Stock, Preston; E. I. Mayne, Manager in Buenos Aires; C. R. Parker, Manager, Traction Department, Bradford; P. Scott, Publicity Manager, London; S. A. Smith, Deputy Chief Engineer, Traction Department, Bradford; C. C. H. Wade, Manager, Traction Sales & Contracts, London.

The Birmingham Railway Carriage & Wagon Co. Ltd. was represented by: Messrs. H. J. S. Moyses, Managing Director; P. Middlemas, Director; J. A. Reid, Secretary; S. Mallett, Works Manager; H. H. Holloway, Chief Engineer; S. Hogg, Chief Draughtsman.

British Steel Founders' Association

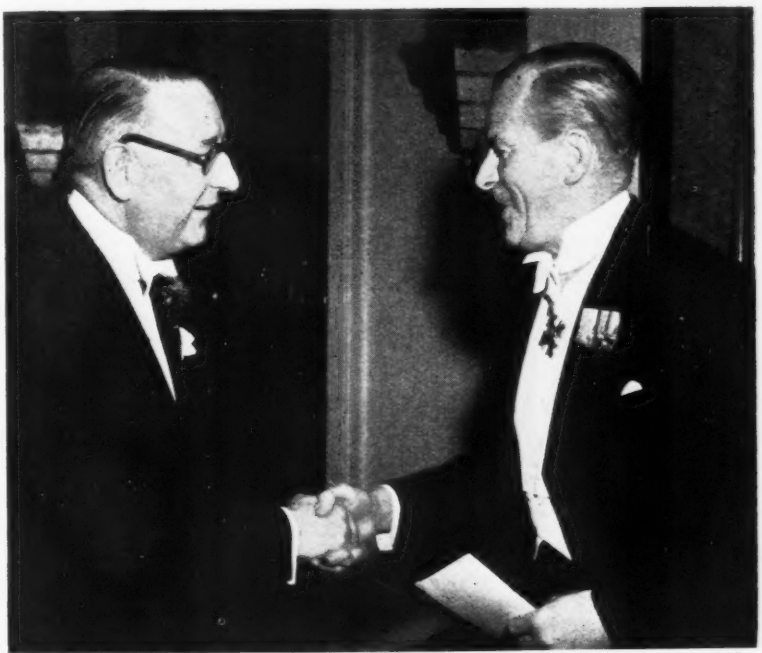
Speeches by leading British industrialists made at the recent Association dinner

Proposing the toast "British Industry" at the British Steel Founders' Association dinner held at Claridge's on December 6, the Chairman of the Association, Mr. Frank Rowe, referred to the part played by privately-owned industry in building up the prosperity of Britain, and to the shortcomings of nationalised concerns such as the coalmining industry, the "groundnuts scheme," and the Festival of Britain. There was, however, an increasingly insistent public demand for a return to efficiency and realism in national and industrial affairs. British industry was at fault in failing to state its own case.

Replying, Sir Robert Sinclair, President of the Federation of British Industries, said that industry would subordinate personal considerations to the country's need. If steel nationalisation went forward, it would not be allowed to interfere with production. But there were enough practical difficulties, such as the defence programme and shortages of materials, to justify the question whether, had the present situation obtained two months ago, the Government would have insisted on the take-over at the earliest possible date, or whether even now the Government might not see wisdom—and even its duty—in postponing the take-over.

Regarding shortages of materials, Sir Robert Sinclair said that whilst controls were undesirable, shortages might make them inevitable. The Federation of British Industries would maintain the closest touch with trade associations and ensure through its Defence Programme Committee that representatives of the industries concerned could pool knowledge and experience and form common policies where necessary. He went on to praise the work of the productivity teams which had visited the U.S.A., and the helpful spirit shown by the American concerns visited, and their staffs.

The President of the Engineering Industries Association, Viscount Davidson, pro-



Mr. R. A. Riddles, Member of the Railway Executive and President of the Institution of Locomotive Engineers, being received by Mr. Frank Rowe at the British Steel Founders' Association Dinner

posing the toast "The Steel Founding Industry," pointed out that the B.S.F.A. was the first body to send a productivity team to U.S.A., and drew attention to the lack of freedom and other dangers inherent in State ownership in industry. Replying, Mr. T. H. Summerson, Vice-Chairman of the B.S.F.A., pointed out that the Association consisted mainly of small-size enterprises, and drew attention to its part in increasing productivity.

Mr. D. W. L. Menzies, Chairman of the Industrial Health in Steel Foundries' Committee of the B.S.F.A., proposed the toast "Our Guests," to which Sir Alexander Ramsey, Director of the Engineering & Allied Employers' National Federation, replied.

London Transport Ticket Hall Facilities

Interchange between stations at Liverpool Street

A new sub-surface ticket hall under Liverpool Street Station, London Transport, came into partial use on November 6. Until ticket offices are installed and other minor works completed the new hall is available only for interchange between the Metropolitan Line and the Central Line and Eastern Region stations.

The scheme incorporates a new subway to the existing Central Line (Broad Street) ticket hall and when it comes into full operation—probably at the end of the year—passengers will benefit by speedier interchange between the Central and Metropolitan Lines and Broad Street and Liverpool Street main-line stations. Also, they will no longer need to cross Liverpool [illegible], one of the busiest thoroughfares in the City.

The new hall is connected by two new escalators to the Central Line, stairways to the Metropolitan Line and the new subway to the Central Line (Broad Street) ticket hall, the latter giving a direct connection with bus services and with Broad Street Station. The direct escalator connection between the Central Line and the Eastern Region station concourse is not affected, and the present subway from the Metropolitan Line to that station has been incorporated in the new scheme. As part of the improvements the existing Metropolitan Line ticket hall has been redesigned and work on it is well advanced.

Heavy Work Involved

The construction of the new 110 ft. by 40 ft. ticket hall involved closing parts of Liverpool Street roadway from time to time, removing some 1,500 tons of spoil, diverting a main sewer and various other mains and cables, and cutting away part of the 75-year old vaults beneath the Eastern Region station. It has taken just over two years to complete, since work was restarted after the war.

When the extension of the Central Line east of Liverpool Street was originally planned, it was foreseen that the existing station—built as a terminus with the primary object of providing interchange with the main line—would be inadequate to cater for the increased volume of traffic which would inevitably result from the Central Line extension and the Shenfield electrification scheme. Construction work was well in hand at the outbreak of war and its completion has been regarded by the London Transport Executive as a matter of highest priority.

Staff & Labour Matters

Railway Wage Claims

Representatives of three railway unions and the Railway Executive held meetings last week with officials of the Ministry of Labour in an attempt to solve the deadlock regarding wage claims; the unions object to the conditions which the Railway Executive has attached to its offer to improve wages. The last of these meetings took place on December 8, after which it was announced that the meeting had been adjourned, and that the unions were seeking a further meeting with Mr. Isaacs himself, which eventually took place on December 12, without conclusive result.

The Minister on December 13 met representatives of the Railway Executive, who explained the basis of their offer and emphasised the necessity for maximum improvement in efficiency and economical working; they could not accept the suggestion that the form of their proposal was precluded by the provisions of the negotiating machinery of the industry. Mr. Isaacs undertook to consider the Executive's representations.

Road Haulage Wages

The Minister of Labour has confirmed the proposals of the Road Haulage Wages Council to increase the statutory minimum pay of about 200,000 road haulage workers from December 22. These proposals involve increases of 7s. per week for adults and from 6s. to 2s. 6d. a week for juniors. In line with these proposals the Road Haulage Executive recently announced wage increases for drivers, mates, and other staff in its employ.

Parliamentary Notes

B.T.C. Films

Arising out of a question by Mr. Peter Thorneycroft (Monmouth—C.) to the Minister of Transport regarding B.T.C. films, a discussion took place on December 4 as to ministerial responsibility for such films, which the Minister, Mr. Alfred Barnes, said were a matter for the B.T.C. Opposition members maintained that films, being mentioned in the B.T.C. annual report, were, as such, a subject which the Lord President of the Council had ruled as proper for questions to the Minister; but the Lord President (Mr. Herbert Morrison) denied this.

Questions in Parliament

B.T.C. and Pensions Schemes

Mr. Peter Thorneycroft on December 4 asked the Minister of Transport what were the grounds of national policy referred to in the B.T.C. second annual report, which precluded the Commission from introducing a pension scheme for their staff.

Mr. Barnes: In the discharge of my responsibilities for pensions under the Transport Act, I must take account of all the relevant circumstances, including the economic position of the industry and the general economic background of the country. At the time referred to in the report the Government did not consider that it would be in the national interest that there should be any large-scale extension of supplementary pensions schemes, and we thought it right to make this view known to the boards of the socialised industries. Without being committed in any way as to the decision in the event of such schemes being put forward, we have now made it clear that the boards are entirely free to negotiate with the unions. Any proposals which resulted would have to be considered on their merits in the light of the circumstances.

B.T.C. Vacancy

Sir Austin Hudson (North Lewisham—C.) on December 4 asked the Minister of Transport whether he had yet appointed a permanent member of the B.T.C. to replace the vacancy created by the death of the late Lord Ashfield.

Mr. Alfred Barnes (Minister of Transport): No. But I hope to be able to fill it shortly.

Sir Austin Hudson: Could the Minister say why there has been this long delay?

Mr. Barnes: One can easily make an appointment, but it is very desirable to acquire a proper balance in these instances. It is not always easy to get persons to leave their other activities for a short period.

Refreshment Rooms

Sir Austin Hudson (North Lewisham—C.) on December 4 asked the Minister of Transport how many of the refreshment rooms referred to in the B.T.C. second annual report were operated by the Hotels Executive; and how many of them were let out to private enterprise.

Mr. Barnes: This information is given on page 318 of the report.

Sir Austin Hudson: Can the Minister say whether the nationalised refreshment rooms now pay their way?

Mr. Barnes: As Sir Austin Hudson knows, I cannot answer every detail of the B.T.C. accounts.

Coal Traffic

Mr. Geoffrey Wilson (Truro—C.) on December 4 asked the Minister of Transport what were the arrangements referred to in the B.T.C. second annual report whereby certain coal traffics, rail conveyed for relatively short distances, were carried at rates below those applicable to land sale tonnage.

Mr. Barnes: The traffic referred to was export coal moved to ports over distances less than the average for land sale traffic. The rates were less than the average for land sale traffic because the distances were less, and, possibly, because of the existence of exceptional rates, the granting of which is a matter for the B.T.C., subject to the approval of the Transport Tribunal in certain cases.

Consultative Committees

Mr. J. R. Bevins (Liverpool, Toxteth—C.) on December 4 asked the Minister of Transport whether, in view of the claim made in the B.T.C. second annual report that few matters had been referred to the consultative committees, he would state the address of the consultative committee to which complaints in the Liverpool-Manchester area should have been referred.

Mr. Barnes stated in a written answer: A transport users consultative committee for the North West Area, which includes the Liverpool-Manchester area, is now in course of being appointed. In the meantime any representations regarding B.T.C. services in this area should be addressed to the Secretary of the Central Transport Consultative Committee for Great Britain.

Mr. S. J. McAdden (Southend East—C.) on December 4 also asked the Minister of Transport how many of the consultative committees other than those established for Wales, Scotland, and London, were, in fact, in existence during 1949; and what were their addresses.

Mr. Barnes, in a written answer, stated: None. As I have previously informed the House, I am now setting up eight further committees, and when this has been done, the whole of the country will be covered.

Central & Southern African Transport Conference

Colonel A. D. Dodds-Parker (Banbury—C.) on December 6 asked the Secretary of State for the Colonies what were the results of the African Transport Conference recently held in Johannesburg.

Mr. James Griffiths stated in a written answer: The recommendations, which are numerous and detailed, are now being considered by the participating Governments.

Nigerian Railway Rolling Stock

Mr. E. H. Keeling (Twickenham—C.) on December 6 asked the Secretary of State for the Colonies whether his attention had been drawn to the official report of the Nigerian Railway by a British railway official, which stated that engine failures in proportion to mileage were four and a half times greater in 1949 than ten years earlier, and that repair output had declined by more than half; if he would state whether this deterioration had continued in 1950; and what were its causes and the proposed remedies.

Mr. James Griffiths (Secretary of State for the Colonies): The causes are fully set out in the report itself in paragraphs 63 to 71 and 134 to 163. In recent months the supply of spare parts has considerably improved, and there has been a small improvement in the figures of repair output and engine failures over the past year. In so far as the position is due to technical inefficiency and low output in the workshops, the Nigerian Government and Railway Administration are making vigorous efforts to effect remedial measures.

Mauritius Railway

Colonel A. D. Dodds-Parker (Banbury—C.) on December 6 asked the Secretary of State for the Colonies what was the annual loss on the railway in Mauritius; and under what ownership and management the railway was conducted.

Mr. James Griffiths, in a written answer, stated: The loss on the Mauritius Railway was Rs. 1,467,457 for the year 1948-49, approximately the same figure as for the preceding year. It is estimated that the loss for the year 1949-1950 will be about Rs. 2,000,000. The railway is owned and managed by the Government of Mauritius.

TERMINAL MOTORCAR SERVICE FOR TOURISTS.—Mr. Victor Bridgen, Joint Managing Director of Gadfrey Davis Limited, motorcar hire operators, said recently that his company now had ready a new service of cars for visitors from the U.S.A. This terminal service, whereby cars can be booked by passengers on Pullman boat trains to meet them on arrival in London, was started through the joint initiative of the Pullman Car Company and Godfrey Davis Limited, though Mr. Bridgen pointed out that this service could not have been operated successfully without the help of British Railways. Charges during the Festival of Britain period, in spite of the increased cost of petrol and so on, will remain the same as when the service was started five years ago. The cars, built by Armstrong Siddeley Motors, were specially designed to meet requirements of American visitors.

Contracts & Tenders

The Western Australian Government Railways have invited tenders for 760 wagon underframes and 710 wagon bodies.

The Egyptian Government is now taking delivery of the 50,000 tons of German rails ordered from Stahlunion Export G.m.b.H., Dusseldorf, through the Stahlunion Co. Ltd., 253, Grand Buildings, London, W.C.2.

An order from Societa, Italiana Ernesto Breda has been placed with Laidlaw, Drew & Co. Ltd. for ten sets of oil-firing equipment for a number of 2-8-2 type locomotives being built for the Hellenic State Railways.

The 66 tank wagons ordered by the Government of Pakistan, Karachi, from Siegener Eisenbahnbedorf A.G., 21b Dreis-Tiefenbach, Kreis-Siegen, I.W. (London Agents: The Stahlunion Co. Ltd., 253, Grand Buildings, London, W.C.2), are at present under the inspection of Messrs. Rendel, Palmer & Tritton, the consulting engineers.

BENGUELA RAILWAY AS RHODESIAN OUTLET.—According to an agency message from Lusaka, the Economic Secretary of Northern Rhodesia has said that formal approval by the Portuguese and Belgian Governments was all that was required to conclude an agreement giving Northern Rhodesia full use of the Benguela Railway route to Lobito Bay. This would be an additional outlet to the Port of Beira and Union of South Africa port routes.

Inspection of Woodhead Tunnel, Eastern Region

Railway Executive and Regional Officers, and representatives of the consulting engineers and contractors, at Woodhead Tunnel on the Manchester—Sheffield main line (see article in our February 24 issue)

Left to right: Messrs. J. D. Dempster, Resident Engineer of Sir William Halcrow & Partners; V. A. M. Robertson, Chief Civil Engineer, Southern Region; J. I. Campbell, Civil Engineer, Eastern Region; J. C. L. Train, Member, Railway Executive; A. M. McTaggart, Director, and W. Brown, Agent, Balfour Beatty & Co. Ltd.; A. S. Quartermaine, Chief Engineer, Western Region; Peter Scott, of Sir William Halcrow & Partners; J. Taylor Thompson, Civil Engineer, North Eastern Region; W. Y. Sandeman, Civil Engineer, Scottish Region; R. Emerton Balfour Beatty & Co. Ltd.

Notes and News

Locomotive Draughtsmen Required.—Two locomotive draughtsmen, one senior, are required. See Official Notices on page 559.

Traffic Instructor Required.—Applications are invited for the post of traffic instructor on the Gold Coast Government Railway, for one tour of 18 to 24 months in the first instance. See Official Notices on page 559.

Draughtsmen (Mechanical), Senior and Junior, Required.—Applications are invited for the posts of senior and junior draughtsmen (mechanical) required by a firm of railway engineers in South East and Central London. See Official Notices on page 559.

Institute of Transport.—The annual general meeting of Corporate Members of the Institute of Transport will take place at 5.45 p.m. on December 18, at 80, Portland Place, London, W.1, when the annual report and accounts for the year 1949-50 will be presented.

Scottish Society of Students of the Locomotive.—A steady increase in membership, which now totalled 50, since the inaugural meeting in September, 1949, was reported at the first annual general meeting of the Scottish Society of Students of the Locomotive held in Glasgow; the financial position of the Society was stated to be sound. Mr. W. Robertson was elected Chairman for the 1950-51 session.

Snowploughs on British Railways.—Ploughs have been fitted to 45 locomotives of the London Midland Region. Other snowplough units, the most powerful of which can bulldoze a way through snowdrifts up to 12 ft. deep, are ready for use. They are housed in the most vulnerable district on the London Midland Region between Leeds and Carlisle where the line crosses the Pennines 1,000 ft. above sea level.

Railway Executive Message of Appreciation to Staff.—The Railway Executive has requested the Chief Regional Officers of British Railways to convey its keen appreciation of the efforts made by all railwaymen concerned in the movement and handling of traffic, particularly coal and merchandise, during the recent adverse weather conditions of fog and snow. The Executive expresses confidence that it can rely on a sustained effort during the present peak demand.

Census of Production for 1948.—The subject of the 1948 Census of Production Preliminary Report No. 90, issued by the Board of Trade, is the railways (civil engineering) trade. As products of outside firms delivered to the civil engineering departments of railways both in Britain and overseas are classified under the several industries concerned, the figures relate to production by railway establishments only. Insofar as strict comparison between 1935 and 1948 is possible, the gross output was £23·5 million in 1935, and £63 million in 1948, while the number of persons employed averaged 102,000 and 108,000 respectively. Preliminary Report No. 91 deals with railway locomotive shops and the locomotive manufacturing (including export) trade, and covers not only all kinds of railway locomotives, but also steam road vehicles. For railway locomotive works the value of production in 1935 and 1948 was £13 million and £38·2 million respectively, whilst the average numbers of workers were respectively 45,000 and 65,000. Locomotive building firms' gross output in 1935 is given as £4·9 million, and as £22·8 million in 1948; the total average numbers employed were 14,000 and 23,000 respectively.

Euston: Renewal of Roof.—Re-roofing at Euston, L.M.R., of 20,000 sq. ft. in area over main line departure platforms Nos. 12-15 is nearly complete. Reglazing provides 25 per cent. additional natural lighting. Similar re-roofing (35,000 sq. ft.) of the arrival side of the station has now begun. The former roofs suffered heavy war damage.

Great Western of Brazil Railway.—The meeting for the voluntary winding up of the Great Western of Brazil Railway Company, to which reference was made in our July 14 and September 22 issues, was held on November 1. Allocations were made of £40,000 for compensation of London staff, and of £20,000 for directors; it is expected that remaining assets will permit of payment of not less than £7 15s. per £10 preferred and ordinary stock unit.

Kyle of Lochalsh Ferry Service.—Following the introduction this year of a passenger ferry on the Kyle of Lochalsh-Kyleakin service the Scottish Region of British Railways has placed an order with Wm. Denny & Bros. Ltd., Dumbarton, for an improved type of ferry vessel for the same service. The new vessel, designed to carry four motorcars, will have covered accommodation for passengers also, and it is expected to be ready for the summer traffic.

Inland Waterways Improvement Scheme at Newark.—To enable larger waterways craft from the Humber area to proceed inland on the Trent as far as Nottingham, the Docks & Inland Waterways Executive has authorised an important improvement scheme at Newark on which work started on December 1. A new lock accommodating four craft instead of one is to be constructed and will conform with the other six locks between Gainsborough and Nottingham.

James Dunnage Memorial Library.—The Institute of Traffic Administration is opening a fund for the endowment of a library to carry on the work of its late founder member and vice-President, Mr. J. A. Dunnage, who was an enthusiast for the establishment of better facilities for the study of transport administration. This new library will bear his name. Many of those now holding high positions in the transport industry have reason to be grateful to Mr. Dunnage for the assistance given in his books and lectures. Contributions to the fund are invited, and may be sent to the Secretary, Institute of Traffic Administration, Dudley House, Southampton Street, London, W.C.2.

Additional Christmas Train Services.—During the Christmas holidays the Southern Region of British Railways will run more than 300 extra main-line trains between London and the Kent and south coasts and the West of England. On Christmas Day, Boxing Day, and December 27, there will be day excursions from London to more than 80 coastal resorts and provincial towns. In the Western Region there will be over 300 additional main-line trains between December 21 and 27; 191 special long-distance passenger trains will be dealt with at Paddington Station during this period and cross-country services will be augmented by 117 specials. There will be a number of alterations in sailings to Ireland from Fishguard and sailing tickets will be required for the Fishguard-Cork service on December 21 and 23. The Eastern Region will run a Sunday service with certain modifications on December 24 and 25 and on other days the normal weekday service will operate with additional facilities to cater for the heavy holiday traffic; between December 20 and 28, 432 additional trains will be run. A number of sailings between Harwich and the Hook of Holland, and Esbjerg will be cancelled.

L.M.R. Excursions to London.—Visits to see the lights in Piccadilly and shows at London theatres are among the attractions of the London Midland Region winter excursion programme which has recently begun. From provincial towns there will be 18 trips to London shows, with a motorcoach tour of the West End and tea and supper. Altogether, with cheap excursions to football matches, ice hockey, and circuses, the London Midland Region programme has reached the figure of 1,000 trips.

Tube Investments Profit Higher.—Unchanged dividends are to be paid by Tube Investments Limited from increased profits. The trading profit for the year ended August 5 has risen to £6,024,839 as compared with £4,840,467 in the previous year. After including other income and deducting £3,583,223 (£3,053,450) for tax the net profit of the group is £2,699,428 (£2,064,382). Sums retained by subsidiaries amount to £477,698 (£460,237) and general reserve again receives £1,500,000. The carry forward is increased by £294,152 to £2,825,420. A final dividend of 12½ per cent. makes 25 per cent. as last year.

London Bus Fleet on Heavy Oil.—The whole of the London Transport fleet of buses and coaches has been operating on heavy oil since November 21. Petrol-driven buses had been in use for some thirty years when the London General Omnibus Company first considered heavy oil engines in passenger vehicles. It was decided in 1934 to adopt the oil engine as the standard power unit for all future London Transport buses and coaches and to convert later types of petrol bus. By 1939, the entire Green Line coach fleet was oil-engined; but for the war, elimination of petrol buses would have been complete by 1942.

Presentations to Norwich Railwaymen.—Mr. H. H. Halliday, Regional Staff Officer, Eastern Region of British Railways, visited the social club at Norwich recently, when he was elected President in succession to Sir Charles Newton. Mr. Halliday presented the Norwich Thorpe Women's Ambulance Team with plaques for securing fourth place in the British Railways and London Transport (Railways) first aid competition in May. He also presented a first aid certificate to Porter B. Cross, together with a letter of commendation to Mr. D. J. Eastaugh, Stationmaster, in recognition of help given to a woman injured while falling from a train.

London Midland Region Staff Discussions.—At the invitation of Mr. John Elliot, Chief Regional Officer, London Midland Region, 250 drivers, porters, clerks, signalmen, shunters, and representatives of all grades of railwaymen in the London area, met him at a London hotel on December 12 in a free discussion on how to improve services and to air views on better working methods. This heart-to-

OFFICIAL NOTICES

DRAUGHTSMEN (Mechanical), Senior and Junior, preferably with permanent way experience, for firm of Railway Engineers in S.E. and Central London. Apply stating experience to Box 925, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

RAILWAY MAINTENANCE PROBLEMS. By H. A. Hull (late District Engineer, L.M.S.R.). Valuable information. With much sound advice upon the upkeep of permanent way. Cloth. 8¼ in. by 5½ in. 82 pp. Diagrams. 5s. By post 5s. 3d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

TRANSPORT ADMINISTRATION IN TROPICAL DEPENDENCIES. By George V. O. Bulkeley, C.B.E., M.I.Mech.E. With chapters on Finance, Accounting and Statistical Method. In collaboration with Ernest J. Smith, F.C.I.S., formerly Chief Accountant, Nigerian Government Railways. 190 pages Medium 8vo. Full cloth. Price 20s. By post 20s. 6d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

Crown Agents for the Colonies

TRAFFIC INSTRUCTOR required by the Gold Coast Government Railway for one tour of 18 to 24 months in the first instance. Commencing salary according to qualifications and experience in the scale £834 rising to £1,114 (including allowances). Outfit allowance payable. Gratuity of £25 for each 3 months' service on satisfactory completion of contract. Free passages. Liberal leave on full salary. Candidates, preferably under 35 years of age and members of Institute of Transport, should have a thorough knowledge of electric train staff working, pilot working, double line block system and safety regulations, a practical knowledge of all sections of passenger and goods station working, including accounts, rates and fares, claims, and a knowledge of centralised train control system, working of shunting yards, train running and traffic statistics. Knowledge of Morse telegraphy desirable, also of working at docks in regard to shipping and warehousing exports and imports. Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper, to the CROWN AGENTS FOR THE COLONIES, 4, Millbank, London, S.W.1, quoting M27288E on both letter and envelope. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration.

WANTED.—Two Locomotive Draughtsmen, one senior. Experience in diesel or electric locomotives desirable but not essential.—Box 923, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

DIRECTORY OF RAILWAY OFFICIALS & YEAR BOOK. A useful reference book for railway officers, engineering firms, and all who do business with railways. The only Directory which enables one to find the right railway and the right officer at the right moment. Issued July each year. Price 30s. net. Tothill Press Limited, 33, Tothill Street, London, S.W.1.

RAILWAY SIGNALLING AND COMMUNICATIONS INSTALLATION AND MAINTENANCE. A practical guide, especially intended to help Signal Inspectors, Installers, Fitters, Linesmen, Draughtsmen, and all concerned with installing and maintaining Signal, Telegraph, and Telephone Equipment. 416 pp. Many illustrations. Cloth. 8s. By post 8s. 6d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

heart talk between the Chief Regional Officer and his staff is the third Mr. Elliot has held since taking over the control of the L.M.R., following similar conferences held in the Southern Region in 1948 and 1949. Similar discussions have already been held at Preston and Carlisle, while future meetings are planned at Manchester, Liverpool, Crewe, Llandudno, and Birmingham. After the discussion Mr. Elliot entertained his guests to luncheon.

Overtaking Track Maintenance Arrears, L.M.R.—Over 8,000 men are now engaged in heavy permanent way work in an effort to overtake arrears of track maintenance on the Euston-Carlisle line of the London Midland Region. While this work is proceeding speed of trains must be reduced at certain places and consequent delays in arrival times may occur.

Richard Thomas & Baldwins Dividend.—The directors of Richard Thomas & Baldwins Limited have decided to pay an interim dividend of 5 per cent. for the period April 2, 1950, to February 14, 1951. In the previous year an interim of 5 per cent. was followed by a final payment of 10 per cent.

Canadian Pacific Final Dividend.—The directors of the Canadian Pacific Railway have declared a final dividend for 1950 of $1 a share, or 4 per cent., payable on February 28 next. With the payment of 50 cents, or 2 per cent., on October 2, the total applicable to 1950 is $1·50, or 6 per cent., compared with $1·25 or 5 per cent., for 1949.

Railway Executive Paper & Printing Department.—The British Railways Regional paper and printing departments at Westbourne Terrace, Wandsworth Road, and Wellers Court, Kings Cross, are being closed. From now on all correspondence, invoices, and accounts should be addressed to Mr. Jos. O'Neill, Paper & Printing Department, Railway Executive, Carlow Street, Euston, London, N.W.1.

Birmingham Productivity Exhibition.—The display by Bakelite Limited at the Birmingham Productivity Exhibition will demonstrate several ways in which the adoption of Bakelite plastics increases productivity. Jigs and tools machined from Bakelite Laminated are light in weight and easy to handle, and complicated shapes can be produced from Bakelite moulding materials. A pneumatic water valve for air compressors will be shown, which was formerly produced from gunmetal castings, and it is claimed that the changeover to Bakelite has effected a saving of 24 hr. of skilled time on each valve. Other exhibits will include moulded telephone plugs and clay filter press cloth nozzles. The latter are now moulded from a special Bakelite material. The exhibition will be held at the Birmingham Central Technical College from December 29 to January 6.

Skefko Ball Bearing Co. Ltd.—At a meeting of the directors of the Skefko Ball Bearing Co. Ltd. recently, an interim dividend was declared of 3d. per stock unit of 5s., free of tax, in respect of the year ending December 31, 1950.

Mexican Railway Company's Funds.—The scheme approved by stock and debenture holders of the Mexican Railway Co. Ltd. on September 13, details of which were given in our issue of August 25 last, for the distribution of the remaining assets, was sanctioned by the High Court on October 16. Distribution of funds to holders of loan capital registered on October 23 will take place in due course.

Transport Services Limited.—In the report of the liquidator of Transport Services Limited for the year ended September 7, 1950, it is stated that the amount of the consideration due from the British Transport Commission for the sale of assets has recently been agreed, and the only matter outstanding in the liquidation is the settlement of outstanding taxation liabilities. It is hoped to settle all outstanding points within the next few months, after which a third and final distribution will be made to ordinary shareholders.

Higher Road Haulage Costs.—A committee of the Road Haulage Association has had under consideration the position arising from the increase of 7s. a week in the wages of road haulage workers which comes into force on December 22, and also other rises in costs which have occurred since May 1, such as tyres by 32½ per cent., petrol by 1d. a gal., spare parts, and lubricating oil. The committee finds that the cumulative effect of these various increases would justify an addition of 5 per cent. to road haulage charges.

Scottish Station Garden Competitions.—Special prizes of £10 each have been awarded to Gleneagles and Kinross Stations for displays entered for the best kept station garden competition for 1950 of the Scottish Region. In the special "B" class Aberdour and Kilmacolm have gained prizes of £8 each, and in the special "C" class £6 each have been won by Racks, St. Cyrus, and St. Monance Stations. In addition, the first class (£5) prize list totals 16 stations, the second class (£4) 64 stations, and in the third class 110 stations have gained awards of £3 each. Certificates of commendation have also been gained by 15 stations.

Further South London Tram Replacement.—The second stage of the London Transport scheme to replace South London trams by buses has been fixed for midnight on Saturday, January 6. Nine tram routes on 63 miles of track are concerned in the changeover, which will result in the complete disappearance of tram services in the Wimbledon, Tooting and Balham areas.

Chilean Transandine Railway.—The offer by a Chilean Government-controlled company, Caja Autonoma de Amortizacion de la Deuda Publica, to purchase for cancellation the whole of the Chilean Transandine Railway 7½ per cent. first mortgage debenture stock at £27 per £100 nominal of stock, has been accepted by the holders of £66,157 nominal amount of stock, about 46 per cent. of the total amount outstanding. The offer was conditional on acceptance by holders of not less than 50 per cent. of the stock.

John I. Thornycroft & Co. Ltd.—After allowing £107,085 for depreciation, the trading profit of John I Thornycroft & Co. Ltd. for the year ended July 1 last amounted to £919,841, as compared with £786,236 in the previous year. Of this, £611,847 is required for taxation, leaving a net surplus of £307,994. Final dividends, less income tax, recommended are 3 per cent. with cumulative preference shares, 5½ per cent. with participating preferred ordinary shares, 12½ per cent. with ordinary shares and 7½ per cent., bonus on the ordinary shares.

Closing of Scottish Branch Line.—The Scottish Region, British Railways, closed the Carstairs-Dolphinton branch line on November 1. The stations concerned are Bankhead, Newbigging, Dunsyre, and Dolphinton. There were no passenger services on the Dolphinton branch. Freight and passenger train traffic in full truck loads are being dealt with at Biggar, Carnwath, or Carstairs, whichever is most convenient. Parcels and sundry goods traffic for Bankhead, Newbigging, Dunsyre, and Dolphin-

ton are being handled at Carstairs Station and a collection and delivery service by road vehicle is operating from that station. The Scottish Region has also closed Gartness Goods Station, Stirlingshire, and traffic previously dealt with there is being handled at Killearn Station unless otherwise consigned.

Statement on Cyprus Railways.—According to an agency message, an official statement made in Nicosia on November 20 reveals that the Cyprus Railways have sustained a loss of more than £180,000 during their 44 years of operation by the Government. The statement refers to suggestions that the railway could be operated much more economically by a private company and, says "it is indeed conceivable that private enterprise might run the railway profitably." Careful consideration is promised to serious proposals by responsible persons wishing to purchase.

Christmas Lectures for Boys.—As in previous years, the Institution of Civil Engineers has arranged a series of Christmas lectures for boys, primarily between the ages of 13 and 17. The lectures, which will be given at the Institution, Great George Street, Westminster, S.W.1, will be on "Railways; how they are built and how they run"; a series which was given successfully four years ago. The series will be as follows: December 29, at 3 p.m., "One hundred miles an hour by train," by Mr. Cecil J. Allen; January 1, 1951, at 3 p.m., "Railways; how they are built," by Mr. L. G. Rock; January 3, 1951, "Railways: how they run," by Mr. O. S. Nock.

Thos. W. Ward Limited.—After providing for taxation the profit for the year ended June 30 last of Thos. W. Ward Limited amounted to £442,964. This, with the £476,881 brought forward from last year, gave an available balance of £895,401. Of this, £73,694 was required for dividends, leaving a disposable balance of £821,707, from which it is proposed to pay a final dividend on the ordinary shares of 10 per cent., a final dividend of 3¼ per cent. on employees' shares, and to transfer £200,000 to general reserve. After making these payments £558,726 is available to carry forward to the current year.

Dorman Long & Company.—The report for the year ended September 30, 1950, of Dorman Long & Co. Ltd. shows that net profit for the year was £2,331,376, which with balance forward from the previous year makes £2,448,007. After deducting dividend on 6½ per cent. non-cumulative first preference shares, and general reserve (£2,000,000), a balance remains of £345,835. It is proposed to appropriate this as follows: dividend on 8 per cent. non-cumulative second preference shares, dividend of 8 per cent. on preferred ordinary shares, with further dividend of 8 per cent. on preferred ordinary shares, and 8 per cent. dividend on the ordinary shares. This leaves a balance to be carried forward of £118,335.

Forthcoming Meetings

December 15 (Fri.).—Carlisle & District Transport Club. Annual Dinner.

December 16 (Sat.).—Permanent Way Institution. Manchester & Liverpool Section, in the Municipal College of Technology, Sackville Street, Manchester. Films: "Sentinels of Safety" and "General Repairs of Locomotives."

Railway Stock Market

Earlier in the week stock markets turned firmer on more hopeful views regarding international affairs, though caution prevailed pending Mr. Attlee's statement on his return from U.S.A. News was awaited of any plans for preventing acute shortages of essential materials, which seem the inevitable result of the rearmament drive, unless the U.S.A. makes larger supplies available.

Until the position regarding supplies of commodities and materials is assessed more clearly, the outlook for many industrial shares is obscure, particularly with the prospect of still higher taxation. Commodity prices and other costs are continuing to rise, and many leading companies require more capital, which it is difficult to obtain in the market unless issues are made in preference shares or other securities ranking in front of ordinary shareholders. Although there has been selective buying of industrial shares the tendency has been for buyers to concentrate on British Funds as a safety first holding until the general position becomes clearer. There has also been rather more attention given to foreign rails, partly because in many cases current market prices are still well below estimated take-over levels.

The rise in British Funds earlier this week was also due to estimates of the issue terms of the additional coal stock required to provide further compensation for colliery companies. At the time of going to press it is assumed that the additional stock may be made rather shorter dated than the existing 3½ per cent. Treasury stock (coal stock) now quoted at 103.

Leopoldina stocks have been more active than for some time on growing hopes of early ratification of the sale agreement. The ordinary stock improved to 9¼, the preference to 25, and the 6½ per cent. debentures rose sharply to 132, while the 4 per cent. debentures were 91. Leopoldina Terminal debentures were also better at 86 and the ordinary units changed hands around 1s. 6d.

Canadian Pacifics have been active and strong up to 42, since the surprise raising of the dividend from 5 to 6 per cent., because of larger investment income, and not of better railway results. It is said, nevertheless, that the increase would not have been made unless there were thought to be reasonable prospects of maintaining the higher dividend in future. Canadian Pacific preference stock was better at 73½ and the 4 per cent. debentures 97½.

In other directions, the better Lautaro Nitrate dividend tended to help sentiment in regard to Antofagasta stocks, the ordinary improving to 6¼ and the preference to 41. Nitrate Rails have been steady at 71s. 3d. with Taltal Rail shares little changed at 15s. 9d.

There were again minor fluctuations in United of Havana stocks with the 1906 debentures changing hands around 16. The annual report put Manila Rail "A" bonds back to 66, but the preference shares were a little firmer at 5s. 9d. San Paulo 10s. units were firmer at 15s. 3d., and Brazil Rail gold bonds 42¼. Great Western of Brazil shares have been well maintained at 155s. La Guaira ordinary stock was 78 and Bolivar "C" debentures 59.

Movements in road transport and kindred shares were again small. West Riding eased to 56s., but Southdown kept firm at 120s., Lancashire Transport were 67s. 6d., and at the time of going to press B.E.T. deferred stock has rallied to £485.

Steel shares again moved narrowly. It now seems that most holders who do not intend to take up the nationalisation steel stock to be issued next February have already sold. It is believed in the market that it is planned to issue steel stock at par, but redemption dates, and also perhaps the rate of interest, will depend on the general conditions ruling in the gilt-edged market next February.

Dorman Long have eased to 31s. after their recent small improvement, and Richard Hill and also Thomas & Baldwins shares have not been affected by announcement of dividends for the period to the vesting date next February. These are, of course, the last payments that will be made by the companies if nationalisation goes through as planned.

Locomotive building and engineering shares have held steady. Vulcan Foundry were 24s., Beyer Peacock 23s. 3d., North British Locomotive eased to 18s. 7½d., but Wagon Repairs held at 15s. 7½d. and Gloucester Wagon at 15s. 9d. Hurst Nelson were 59s. 6d. but Birmingham Wagon came back to 30s. 9d.

Traffic Table of Overseas and Foreign Railways

	Railway	Miles open	Week ended	Traffics for week: Total this year	Traffics for week: Inc. or dec. compared with 1948/49	No. of week	Aggregate traffics to date: Total 1949/50	Aggregate traffics to date: Increase or decrease
				£	£		£	£
South & Central America	Antofagasta ...	811	3.12.50	116,250	+ 41,700	48	3,295,024	+ 76,310
	Costa Rica ...	281	Sept., 1950	c926,567	+ c49,730	13	c3,345,871	+ c436,566
	Dorada	70	Oct., 1950	37,409	+ 5,561	43	391,233	+ 94,355
	Inter. Ctl. Amer. ...	794	Oct., 1950	$974,149	+ $394,917	43	$11,201,432	+ $1,091,307
	La Guaira	22¼	Sept., 1950	$69,726	— $39,529	39	$725,535	— $241,943
	Nitrate	382	15.8.50	10,816	— 8,656	32	286,336	+ 6,203
	Paraguay Cent. ...	274	1.12.50	₲229,969	+ ₲86,539	22	₲4,360,958	+ ₲1,211,143
	Peru Corp. ...	1,050	Nov., 1950	$7,577,000	+ $1,083,700	22	$38,783,000	+ $11,773,242
	,, (Bolivian Section)	66	Nov., 1950	Bs.13,612,000	+ Bs.2,401,000	22	Bs. 56,586,000	+ Bs.4,428,836
	Salvador	100	Aug., 1950	c88,000	+ c7,000	9	c193,000	+ c20,000
	Taltal	154	Nov., 1950	$2,021,426	+ $408,947	22	$7,821,686	+ $1,641,363
Canada	Canadian National†	23,473	Oct., 1950	18,063,000	+ 2,947,000	43	150,250,000	+ 13,286,000
	Canadian Pacific† ...	17,037	Oct., 1950	12,247,000	+ 1,163,000	43	103,218,000	+ 2,895,000
Various	Barsi Light* ...	167	Sept., 1950	18,540	+ 652	26	177,870	— 1,515
	Egyptian Delta ...	607	10.10.50	18,245	+ 1,296	28	319,911	— 24,005
	Gold Coast ...	536	Oct., 1950	261,844	+ 44,691	31	1,651,230	+ 35,555
	Mid. of W. Australia	277	Sept., 1950	38,775	+ 7,000	13	110,856	+ 29,381
	Nigeria	1,900	Jan., 1950	502,360	+ 38,978	44	5,017,814	+ 266,573
	South Africa ...	13,347	11.11.50	1,815,220	+ 263,151	32	53,475,560	+ 5,646,469
	Victoria	4,744	Aug., 1950	1,886,505	+ 666,194	9	—	—

* Receipts are calculated at 1s. 6d. to the rupee

† Calculated at $3 to £1